



EASTERN RESEARCH GROUP, INC.

MEMORANDUM

TO: Fred Porter, U.S. Environmental Protection Agency

FROM: Ruth Mead and Mary Lalley, Eastern Research Group, Inc.

DATE: March 23, 1998

SUBJECT: Final Minutes of February 24-25, 1998 Industrial Combustion Coordinated Rulemaking Coordinating Committee Meeting

1.0 INTRODUCTION

- The eighth meeting of the Coordinating Committee (CC) for the Industrial Combustion Coordinated Rulemaking (ICCR) project was held on February 24-25, 1998 in Winston-Salem, NC.
- A meeting agenda outlining the topics of discussion is included as attachment 1. The topics shown for Wednesday, February 25 from 1:00 p.m. to 3:45 p.m. were replaced by a discussion of cross-cutting MACT floor issues.
- The purposes of the meeting were to:
 1. Formulate guidance to Source Work Groups (WG) on pollution prevention.
 2. Be informed about WG closure and formulate recommendations to EPA, if appropriate.
 3. Be informed about WG progress and provide feedback to WGs, as appropriate.
 4. Begin discussing maximum achievable control technology (MACT) floor issues.
- A complete list of attendees and their affiliation is included as attachment 2.

2.0 SUMMARY OF DISCUSSION

The meeting discussion generally followed the agenda. Topics of conversation are summarized in the following sections:

- 2.1 General Business and EPA Feedback
- 2.2 Milestone Tracking Subgroup Report and WG Status Reports
- 2.3 Incinerator WG Informational Presentation/Discussion
- 2.4 Boiler WG Informational Presentation/Discussion
- 2.5 Pollution Prevention Subgroup Report, Discussion, and CC Recommendations
- 2.6 Economic Analysis WG Report
- 2.7 Process Heater WG Closure Presentation on Direct-Fired Units, Discussion, and CC Recommendations
- 2.8 Process Heater WG Report on MACT Floor for Indirect Gas- and Liquid-Fired Process Heaters
- 2.9 MACT Floor Exercise

2.1 General Business and EPA Feedback

General Business.

- Fred Porter opened the meeting. The CC had no comment on the WG membership changes described by EPA, and agreed to requests for non-members to sit at the table for specific topics of discussion.
- As of March 2, the Transfer Technology Network (TTN) will be fully converted to a website. The dial-up system will no longer be maintained.

Polycyclic Organic Matter.

- Fred Porter reported back to the CC on polycyclic organic matter (POM). The Agency has not adopted a single definition. The EPA is using three characterizations of POM in inventory work: one is based on 7 polynuclear aromatic hydrocarbon (PAH) compounds, another on 16 PAH compounds, and

the third is extractable organic matter (EOM). The EPA will likely chose what makes sense for each source category.

- One CC member suggested the option of using one compound as a surrogate for POM. Another said EOM is easy to measure but may not relate to health effects. The seven PAH are carcinogenic. Others said the 16 PAH should be considered because they are concerned with other health effects in addition to carcinogenicity.
- During the public comment period,, David Marrack, an environmental organization representative and member of the Boiler WG and Incinerator WG commented that there is little cost difference in analyzing the 16 versus 7 PAH compounds and it is important to know which PAH are emitted to assess impacts and develop regulations. He said that nitrated aromatic hydrocarbons formed after the stack in the ambient air are a concern.

Dr. Marrack referred to an article “Carcinogenic PAHs in California’s Ambient Air” published in December 1997 “Research Notes”, No. 97-13, California Environmental Protection Agency Air Resources Board. The report on which the Research Note is based is available from NTIS and is entitled “Lifetimes and Fates of Toxic Air Contaminants in California’s Atmosphere”, by Roger Atkinson and Janet Arey.

Database Update.

- The final version of the Inventory Database (Version 3.0) was released February 17 and can be downloaded from the TTN. The Survey Database scanning errors have been corrected and version 2.0 will be released the week of March 2.
- The Emission Database will continue to grow as more test reports are obtained. It is broken into five separate databases, one for each source category. Version 2.0 containing additional boiler, process heater, and incinerator test data, will be posted on the TTN the week of March 2.

EPA Actions on Previous CC Recommendations.

- Regarding previous CC recommendations for gas turbines and IC engines:
 1. The EPA plans to adopt the position of the majority stakeholders should EPA do additional testing on gas turbines. If new information becomes available, EPA can reconsider.

2. The EPA will proceed with internal combustion (IC) engines testing as recommended using an EPA contractor. The pollutants listed in the majority recommendation will be measured. If new information becomes available, EPA can reconsider.
- Regarding the solid waste definition, Fred Porter reported that EPA management has concluded that there is a need to develop a definition of nonhazardous solid waste for purposes of Section 129 of the Clean Air Act (Act) only. Management has asked EPA staff to flesh out a definition based on the structure recommended by the CC. If sludge, garbage, refuse, or other discarded material including solid, liquid, semi-solid, or contained gaseous material is burned, it is a solid waste with three exclusions:
 1. Fuels burned with energy recovery would not be solid wastes. Current staff thinking is that the fuel lists would include natural gas, fuel oils, coals, and clean wood.
 2. The definition would also exempt the CC recommended list of three materials that are burned to recover their chemical constituents. The preamble would ask for comments on additional materials.
 3. The EPA Office of Air and Radiation (OAR) and the Office of Solid Waste (OSW) staff are coordinating on fleshing out a comparable fuels exclusion, but a decision has not yet been made on whether to include a comparable fuels exclusion in the solid waste definition.
 - CC members commented that to perform analyses and meet regulatory deadlines WGs will need to know whether certain materials are likely to be considered solid wastes, which fall under Section 129, or fuels which fall under Section 112 of the Act. Mr. Porter stated that WG EPA Co-Chairs are prepared to provide their best judgement of where a specific material is likely to fall if a WG needs to make an assumption in order to perform their analyses.
 - Action Item: A member asked if EPA can put their decision on the solid waste definition in writing. Mr. Porter will take this request to the Agency for consideration.

2.2 Milestone Tracking Subgroup Report and WG Status Reports

- The milestone tracking subgroup report (attachment 3) was presented and discussed. Members commented that it provides a lot of useful information. Various members noted that the next few months will be a very busy time for the WG's and CC. The groups will need to push to reach closure, make

recommendations, and move on. An industry representative noted that EPA will probably be forced to make decisions in time to meet the statutory deadlines, so the CC needs to develop recommendations within those timeframes.

- During public comment, Jim Seebold, a member of the Process Heater WG, asked if the subgroup had concluded whether the WGs are on schedule. Subgroup members explained that the charter of the tracking subgroup is to present information on progress and schedules provided by the WGs and not to make value judgements.
- Action Item: Members asked if EPA could provide dates by which the CC needs to provide regulatory recommendations in order to meet the schedule in the Act. Fred Porter will take this request back to EPA for consideration.
- WG status reports are included as attachments 4 through 8. Questions on WG consideration of pollution prevention were addressed during the pollution prevention subgroup presentation (see section 2.5). There were no other questions on the WG status reports.

2.3 Incinerator WG Informational Presentation/Discussion

- Norm Morrow presented the Incinerator WG report. He called attention to the fact that there are now 4 instead of 5 subgroups because EPA is considering small municipal waste combustors (MWC's) under the MWC MACT standards project. The WG is not actively working on small MWC's and three subcategories of units that would be covered by Section 112. They are giving priority to the Section 129 efforts.
- An environmental organization representative strongly objected to EPA looking at MWC's separate from the ICCR because they are an important concern to the environmental community. He would like to work out a way so the ICCR can continue to provide input on MWC's. Leslye Fraser of EPA Office of General Counsel (OGC) reviewed a recent MWC court decision and commented that the Act created two size categories of MWC's--those above or below 250 tons per day (tpd) capacity. Many of the units below 250 tpd (those between 40 and 250 tpd) were already being covered in a separate MWC rulemaking, and it seems more consistent with the Act and court decision to consider all MWC's smaller than 250 tpd together rather than have the very small units under the ICCR. An industry representative noted that landfill gas flares may be covered under a separate landfill MACT project EPA is starting. Mr. Porter stated that EPA is coordinating these efforts.

- Mr. Morrow discussed the schedule for the regulatory alternatives paper (RAP). Under court order, EPA is required to prepare a regulatory options white paper for Section 129 industrial and commercial waste combustion units by November 1998. The Incinerator WG plans to prepare a draft regulatory alternative paper for the CC to consider in providing input and recommendations to EPA for their white paper. They are coordinating with the Boiler WG, which has some units covered by Section 129. An outline for the RAP is included with the Incinerator WG status report (attachment 4). The WGs would like comments on the structure and proposed content shown in the outline. One CC member commented that more detailed rationale for the recommendations may need to be included in the RAP or in an appendix.
- If any WG other than boilers and incinerators is impacted by Section 129, contact Norm Morrow or Rick Crume to coordinate the RAP. Members should send comments on the outline for the paper to Mr. Morrow or Mr. Crume.

2.4 Boiler WG Informational Presentation/Discussion

- Jim Stumbar presented the Boiler WG status report (attachment 9). He noted that the WG is facing a very complex task because of the great diversity of fuel types and equipment types and sizes. Many units co-fire multiple fuels and wastes, so it may be difficult to determine subcategories and what is covered by Section 112 versus Section 129. While the Boiler WG is behind some of the other source WGs, the WG is moving ahead in identifying subcategories, hazardous air pollutants (HAPs) of interest, model boilers, and preliminary MACT floor analyses. Leads have been identified to begin work on costing and economic analysis inputs. The WG has been coordinating with other WGs on the RAP and as a member of the Pollution Prevention Subgroup.
- Wendell Brough and Andy Bodnarik gave presentations on HAPs of interest. Mr. Brough represented the current majority position (attachment 10) and Mr. Bodnarik the current minority position (attachment 11). However, they and Mr. Stumbar stated that the Boiler WG has not reached closure on a pollutant list, and all parties believe they can reach a greater degree of consensus within the WG. The WG requested suggestions and input from CC members that the WG can consider in further WG deliberations.
- CC members suggested that the WG needs to identify whether the list of pollutants is a list of interest for emissions testing, regulation, or some other purpose.
- The presentations compared boiler emissions of some compounds to New Hampshire de minimis levels. These de minimis levels are based on conservative screening estimates of risk. Boiler WG and CC members expressed some concerns

on the screening protocol and on what emission factors the groups used. A State agency representative noted that other States use similar screening approaches based on ambient air levels and health effects. Some CC members agreed that consideration of risk screening tools could be useful in prioritizing pollutants because it is not feasible to regulate all 188 listed HAPs. Those that remain after initial screening merit further consideration.

- A CC member asked why the list for pollutants for clean wood includes criteria pollutants whereas the list for fossil fuels did not. A Boiler WG member replied that the fossil fuel subgroup has not considered criteria pollutants yet. They plan to consider this in the future.
- Some industry representatives commented that wellhead gas is not much different than pipeline quality gas with regard to HAP emission characteristics. They suggested the gases be grouped together. A State representative recalled that some wellhead gas contains mercury. Industry representatives believed mercury to be an issue for only a few wells. They suggested that perhaps these situations could be addressed separately. Much wellhead gas goes straight to pipelines. Members suggested that WG review available information and consider wellhead gas further.
- During the public comment period, Lee Gilmer who represents a petroleum company and is a member of the Process Heater WG raised questions on the New Hampshire screening protocol and on what the HAP list would be used for. He and others also suggested combining wellhead gas with natural gas. David Marrack, an environmental organization representative and member of the Boiler WG and Incinerator WG expressed concern about HAPs in wellhead gas. He also said that the emission factors and health data referred to in the minority report are publicly available.
- Action Item: Boiler WG representatives agreed that they would consider the CC discussion and work together within the WG to refine the list of pollutants further. They pointed out that the current majority and minority pollutant lists differ by only a couple HAP compounds, and more information may resolve these differences.
- Action Item: CC members should give further comment on the boiler list of pollutants to Jim Eddinger or Jim Stumbar by March 6. The Boiler WG plans to report back at the April CC meeting with closure on the list of pollutants and preliminary testing recommendations.

2.5 Pollution Prevention Subgroup Report, Discussion, and CC Recommendations

- Alex Johnson presented the Pollution Prevention Subgroup Report (attachment 12). The subgroup has four teams investigating:
 - ▶ input (fuel/waste management)
 - ▶ good combustion practices (GCP)
 - ▶ operator training
 - ▶ output (energy management)
- The subgroup has developed GCP recommendations for the CC. The subgroup would like to continue work on the other three topics and present further recommendations to the CC at the April meeting.
- Mr. Johnson requested an extension of the Pollution Prevention Subgroup Charter to allow the subgroup to continue working.

Decision: The CC agreed to extend the charter until the April 28, 1998 CC meeting.

- The CC discussed the subgroup recommendations on GCP. The subgroup report characterizes GCP techniques, gives examples of practices, and identifies possible standards for Source WGs to consider. The subgroup acknowledges that specific techniques and examples are not applicable to all combustion sources, and that the list is meant to provide information for WGs to consider.
- Several members stated that WG flexibility is important, and the CC should not make the presumption that WGs and the CC will include all of the listed techniques and practices in future regulatory recommendations. Some members expressed support for a carbon monoxide (CO) emission limit as an indicator of GCP and pointed out that Section 129 required CO limits for waste-fired combustors. One member noted that CO concentrations vary by combustion device and fuel type, so if WGs consider recommending CO limits they need to be aware of these differences. Others suggested that each WG should look at whether a CO limit or some other type of monitoring makes sense for their subcategories.
- During the public comment, Lawrence Otwell who represents Georgia Pacific and is a member of the Process Heater WG noted that regarding stoichiometric ratio, the unit load must be considered in addition to the unit design and fuel. At different loads, different stoichiometric ratios or CO levels may be appropriate. David Marrack, who represents an environmental organization and is a member of the Boiler WG and Incinerator WG suggested that the important factors of time,

temperature, and turbulence should be discussed in the pollution prevention recommendations.

- Decision: The CC agreed to forward the 2-page GCP document (attachment 13) as guidance to the WGs, with the understanding that the introductory language in the document provides WG flexibility.

2.6 Economic Analysis WG Report

- Joe Mackell of the Economic Analysis WG (EAWG) provided a brief status report. Mr. Mackell presented and discussed the four slides included as attachment 14, which are part of a presentation given to the five Source WGs.
- Mr. Mackell pointed out that the EAWG was anticipating receiving preliminary information in January and final information in April. The EAWG has not received any information and no longer expects final information to be available by April. Mr. Mackell explained that the calendar presented by the EAWG is based on “must have data”, data that are required to perform the required economic analysis. The EAWG will require six months after “must have” data are received to perform economic analysis. Mr. Mackell showed how information provided by the WGs will be linked together and then expanded to a national level.
- The EAWG proposed using 1998 dollars for cost estimates and a base year of 2005 for impacts assessment. Mr. Mackell added that a discount rate for the analysis is being developed.
- It was noted that the Environmental Caucus presented a paper on requirements and issues regarding cost and benefit analysis. The paper will be posted to the ICCR bulletin board on the TTN.
- An EPA representative explained that, in typical rulemaking processes, the EPA personnel responsible for the economic analysis would meet with those responsible for developing the rule to develop an approach for the economic analysis. For the ICCR, the EAWG will work with the source WGs to develop the approach. The EAWG is depending on the Source WGs to estimate the cost of the ICCR regulations to the owners and operators of combustion devices. The EAWG will estimate the impacts the regulations will have on industries and consumers.
- Several committee members requested that the EAWG present the approach they plan to use for the economic analysis once they have received information from the WGs. One committee members suggested that issues will apply to more than one Source WG and the approach for these issues should be consistent. Another committee member stated that the approach for the economic analysis should be

holistic because many industries use several of the combustion devices included in the ICCR.

- One committee member pointed out that the Source WGs may not be aware that they are the source of information for small businesses and suggested that trade groups may be a better source of information. Another committee member stated that the EAWG will need to work with the Source WGs to characterize the sources. Several committee member expressed concern regarding the representation of small businesses.
- Action Item: CC members should think about ways to increase small business representation in the ICCR and bring ideas to the April CC meeting.
- Decision: The CC endorsed using 1998 dollars for cost estimates and a base year of 2005 for impacts assessment.

2.7 Process Heater WG Closure Presentation on Direct-Fired Units, Discussion, and CC Recommendations

- Bruno Ferraro presented a position paper on the Process Heater WG's closure decision not to focus on direct-fired process heaters. The paper is included as attachment 15. Mr. Ferraro explained that it is the consensus of the Process Heater WG that:
 - ▶ The focus of the WG will be on indirect-fired heaters.
 - ▶ Direct-fired heaters should be addressed under source-specific regulations based on MACT (referred to as MACT rules or standards).
 - ▶ If a category of direct-fired heaters is discovered that will not be addressed by a source-specific MACT rule, the category could be considered for inclusion in the ICCR.
- In response a question from a committee member, Mr. Ferraro explained that the WG determined that the vast majority of direct-fired process heaters in the database would be addressed by another MACT rule.
- One committee member expressed concern that good operating practices identified for indirect-fired process heater will not be considered by those developing rules for direct-fired process heaters and asked if conclusions for indirect-fired process heaters could be communicated to people developing rules for direct-fired units. An EPA representative explained that, as a FACA, the ICCR CC can make recommendations to EPA. One committee member expressed dissatisfaction with the decision to exclude a category of units he believes to be within the scope of the ICCR.

- Lawrence Otwell, representing the Process Heater WG, explained that the WG considered the following in reaching their decision: 1) there are few direct-fired process heaters which a MACT regulation will not cover; 2) direct-fired units require an industry-specific approach; 3) EPA has stated that they intend to focus their resources on indirect-fired units; and 4) EPA's mechanism for investigating sources for inclusion in a MACT regulation are a more efficient way to address direct-fired units.
- Decision: The CC agreed to make the following recommendations to EPA on direct-fired process heaters:
- Both direct and indirect fired process heaters were included in the initial scope of the Industrial Combustion Coordinating Rulemaking. However, the EPA has established separate rulemaking projects for development of MACT standards for direct fired process heaters and the Coordinating Committee recognizes that direct fired process heaters will be addressed in these projects. Therefore, the Committee forwards the following findings and recommendations to EPA: The Coordinating Committee recommends that EPA communicate to these direct fired process heater MACT projects future findings and recommendations on controlling pollutants from combustion developed by the Industrial Combustion Coordinated Rulemaking. The Committee also recommends that EPA refer back to the Industrial Combustion Coordinated Rulemaking any direct fired process heaters not adequately addressed by other MACTs.
- The CC also agreed to include the information provided in the Process Heater WG's report as the rationale for the recommendation.

2.8 **Process Heater WG Report on MACT Floor for Indirect Gas- and Liquid- Fired Process Heaters**

- Lee Gilmer, representing the Process Heater WG, presented an analysis supporting the WG's consensus decision that the MACT floor for indirect gas-, fuel oil-, and fuel oil-like-fired process heaters is not an add-on control device. The presentation materials are included as attachment 16.
- Mr. Gilmer provided the following in addition to the information presented in the handouts:
 - ▶ The analysis is based on version 2.0 of the inventory database, but the same results would likely be achieved using version 3.0.
 - ▶ The title for the fourth page of the handout should be "Indirect Fired Process Heater Summary".

- ▶ “Controlled” heaters may have flue gas recirculation, oxygen control, or other controls that are not add-on control devices.
 - ▶ The WG believes that the database provides a representative sample of indirect-fired process heaters.
 - ▶ Detailed review of the database revealed that many of the control devices listed for process heaters are actually for the process fed by the heater, not the heater itself. This is the reason for the differences between the third and fourth page of the handouts.
 - ▶ The analysis presented does not include process heaters that are fired with solids or liquids that are unlike fuel oil
- Members of the CC requested clarification on whether the WG’s conclusion is that less than one percent of heaters have HAP controls in place or that less than one percent of heaters have add-on controls in place.
 - Several CC members expressed confusion over what the Process Heater WG presented and what the CC was being asked to do. CC members asked that the conclusion presented be restated or added to make it clear that the WG is concluding that the MACT floor is not add-on control.
 - One committee member expressed interest in controls for criteria pollutants, based on discussions of interactions between HAPs and criteria pollutants.
 - A committee member and a member of the audience suggested that the results may be different if the analysis was performed on various subcategories.
 - During the public comment period, Andy Bodnarik, of the Boiler WG, asked about the definition of “HAP control” and pointed out that control devices for particulate matter (PM) may control metallic HAPs. Mr. Gilmer responded that none of the indirect-fired heaters had controls in place for PM on the heater itself.
 - The CC thanked the Process Heater WG for the presentation and asked the WG to consider the CC’s discussion in their future work.

2.9 MACT Floor Exercise

- Rich Anderson introduced an exercise for CC and audience members to participate in. Mr. Anderson explained that the objective of the exercise was to raise issues associated with determining a MACT floor when calculations are not straight forward. These issues are cross-cutting and may pertain to situations faced by multiple WGs. Mr. Anderson added that the exercise is an opportunity for CC members to share ideas with WG members and it is not expected to result in closure. John Huyler reviewed the steps and ground rules for the exercise, which

are included as attachment 17. Leslye Fraser reviewed relevant sections and definitions from the Clean Air Act, which are included as attachment 18.

- The exercise involved a case study, which was presented by Roy Carwile. The case study, included as attachment 19, describes a fictitious combustion device subcategory and the data available for it. Mr. Carwile provided the following points of clarification:
 - ▶ The variability in emission data presented is not systematic; it can not be explained.
 - ▶ The test data, while limited is representative of the subcategory.
 - ▶ The test data were obtained using the most accurate sampling methods available.
 - ▶ The units were operating within normal ranges during testing.
 - ▶ Testing more units may result in a greater range of data points, but the averages and standard deviations would be the same.
- CC and audience members were asked to break into groups, consider the case study, answer the questions included in attachment 17, and then report back to the Committee. Seven groups were formed. Table 1 provides a summary of the responses to the questions in attachment 17. In addition to the responses, groups reported the following:
 - ▶ Group 3 suggested that since unit #1 represents 20 percent of the data, which is greater than 12 percent, it could represent the MACT floor. Group 3 suggested, as an alternative approach, basing the MACT floor on the worst performing unit, unit #2. Group 3 suggested using a long averaging time in conjunction with the average emissions for unit #2. Group 3 also suggested testing the fuel, putting the data in the context of a level of concern or pounds per year de minimis, doing more testing and reviewing data for similar sources.
 - ▶ Group 4 suggested performing more testing or expressing the emissions in a different format, such as pounds per year, pounds per production rate, or pounds per square feet heated.
 - ▶ Group 6 suggested possible alternatives to an emission limit including yearly tune-ups and in-house training. Group 6 stated that continuous emission monitors are not an option.
 - ▶ Group 7 pointed out that four out of five units have emissions that are below the average of the average emissions for each unit. Group 7

concluded that it may be possible to improve performance through good combustion practices, pollution prevention and operator training.

- Coordinating Committee members were asked for their reaction to the exercise. Opinions expressed included the following:
 - ▶ Some members expressed concern that groups determined that no MACT floor could be identified. One member suggested that the focus should be on determining why emissions vary. Several members stated that more data are required.
 - ▶ Numerous committee members agreed that a MACT floor could not be determined with the data for various reasons. Reasons included: the data do not show an emission reduction; the best performing units can not be identified; a way to reduce emission can not be identified; and all of the data points are essentially the same number, as the differences between the data points are not systematic.
 - ▶ Several CC members found the exercise to be useful. An EPA representative stated that the exercise identified approaches that may not have been considered previously.
- Observations were also solicited from members of WGs asked to sit at the table during the exercise. Views in addition to those expressed by the CC members include:
 - ▶ The collection of additional data would not assist in identifying a floor, as the distribution and averages of emissions would be the same.
 - ▶ A standard that owners and operators would not know how to meet should not be set. If an unrealistic emission limit is set, the only way some units will be able to comply is to shut down.
- Members of the audience provided the following comments during the public comment period:
 - Dr. David Marrack, a Boiler WG and Incinerator WG member, pointed out that, if two standard deviations are added to the range of emissions for each unit, units #1 and #5 are the same. Dr. Marrack speculated that unit #4 is not operating with GCP. Dr. Marrack stated that knowing what the CO emission were during testing is critical to understanding the emissions presented.
 - Jocelyn Siegel, of Abt Associates, suggested that unit #1 appears to be better controlled and questioned whether a limit could be set without knowing what is

being done. Ms. Seigel also questioned whether a limit had to be achievable, or if the purpose of a MACT standard is to force improvement.

- Jim Seebold, a Process Heater WG member, stated that feasibility demands achievability.
- Bruno Ferraro, a member of the Process Heater WG, stated that, if the ground rules of the exercise are followed, it is not difficult to determine that there is no MACT floor.
- Tim Hunt, of the American Petroleum Institute, asked if, considering the overall schedule and lack of progress, the CC would be able to put aside a subcategory of combustion devices if it was determined that their emissions are relatively low. Mr. Hunt stated that the flexibility provided by the Act should be put to use.

3.0 NEXT MEETINGS

- Agenda items for the April 28 & 29 meeting include:
 - ▶ Incinerator WG presentation on remaining section 112 categories.
 - ▶ Brief budget status report (particularly testing budget).
 - ▶ Boiler WG progress on HAPs list and testing.
 - ▶ Pollution prevention subgroup presentation
 - ▶ Reciprocating internal combustion engines (RICE) WG presentation.
 - ▶ Possible Economic Analysis WG presentation on approaches for analyses.
 - ▶ Discussion of ways to increase small entity participation.
- Any additional agenda topics should be sent to Fred Porter.

- Future meeting dates and locations are:

April 28-29, 1998	Fort Collins, CO
July 28-29, 1998	Long Beach, CA
September 15-16, 1998 [note date change]	Research Triangle Park, NC
December 15-16, 1998	Houston, TX

These minutes represent an accurate description of matters discussed and conclusions reached and include a copy of all reports received, issued, or approved at the February 24 - 25, 1998 meeting of the Coordinating Committee. Fred Porter, EPA Co-Chair.

Table 1. Responses to Case Study Questions

Group	1. Can one identify MACT floor? Is there a MACT floor? Does one of the approaches identified work? If not, is there another approach that can be identified?	2. If a MACT floor is identified, must it include an emission limit?	3. What is achievable?	4. How do you define the best performing units?
Group 1 (EPA representatives)	can not identify MACT floor			can not identify a best performing group
Group 2 (Diverse)	only MACT floor would be arbitrary and would violate §112(d)(3)(A)	no	the highest data point for unit #4, but would violate §112(d)(3)(A)	unit the achieves values below and does not achieve any values above the other units
Group 3 (State and local representatives)	can identify MACT floor, two approaches	usually	good combustion practices	unit #1 or unit #2, depending on approach
Group 4 (environmental group and industry representatives)	members did not agree on answers			
Group 5 (State and industry representatives)	data and information indicate not way to determine MACT floor, there is no MACT floor	no reasonable approach to setting numeric limits, would be arbitrary		
Group 6 (representatives of the Boiler WG)	can not identify MACT floor	against setting numerical limits		
Group 7 (1 person)	MACT floor is average of average emissions for each unit, or the average of unit #1 emissions.			could not identify best unit

Attachment 1

Coordinating Committee Agenda

INDUSTRIAL COMBUSTION COORDINATED RULEMAKING
Coordinating Committee
February 24-25, 1998

Adam's Mark Hotel Winston Plaza
425 North Cherry Street
Winston-Salem, NC

DRAFT AGENDA

Notes:

- **“Business Casual” is acceptable attire for all Coordinating Committee and Work Group meetings**
- **Materials posted on the TTN one week or more prior to the meeting will not be provided at the meeting. Please bring your own copies. See below for location of documents that will be used directly during the meeting.**

Major Meeting Objectives:

- **Formulate guidance to Source Work Groups considering recommendations from the Pollution Prevention Subgroup on how to incorporate pollution prevention into regulatory recommendations.**
- **To be informed about Workgroup closure and formulate recommendations to EPA, if appropriate - Process Heaters (MACT floor - existing units), Boilers (Pollutants of Concern)**
- **To be informed about Workgroup progress and provide feedback/guidance to Workgroup, as appropriate - Incinerators, Boilers, Process Heaters, Turbines, and Economics Workgroups.**

Location of Documents on TTN Needed for the Meeting

	Status Report	Other
Coordinating Committee		<ul style="list-style-type: none">• Agenda (CC24FE8A.WPD/PDF)• Milestone Tracking Committee Status Report (MILSTRPT.ZIP)
Boiler WG		<ul style="list-style-type: none">• Minority report on HAPS of concern (MINHAPRP.WPD/.PDF)• Majority report on HAPS of concern (MAJHAPRP.ZIP) (MHAPRTAD.ZIP) - Adobe (*.pdf) format
Process Heater WG		<ul style="list-style-type: none">• Closure recommendation to the Coordinating Committee regarding direct-fired Process Heaters (PHDIRECT.WPD/PDF)• Slides for Process Heater Work Group closure presentation on MACT floor (PH24FE8P.ZIP)
Incinerator WG	INSTFEB.WPD/PDF	
IC Engine WG	ENSTFEB.WPD/PDF ICMILTBL.WPD/PDF	
Combustion Turbine WG	CTSTFEB.WPD/PDF	
Testing and Monitoring Protocol WG	TMSTFEB.WPD/PDF	
Economic Analysis WG	ECSTFEB.WPD/PDF	

All of these files can be found on the Coordinating Committee Submenu under “Pre-Meeting Review Documents”.

Tuesday, March 24, 1998

- 9:00 am. Welcome and Agenda Review**
- 9:10 am General Business & EPA Feedback**
- **Membership and Non-Members at Table**
 - **POMs**
 - **Databases**
 - **Recommendations Delivered to EPA on December 17, 1997**
 - ▶ **Solid Waste Definition Under Section 129**
 - ▶ **Internal Combustion Engines Testing Recommendations**
 - ▶ **Gas Turbines Testing Recommendations**
- 10:15 am Report from Milestone Tracking Subgroup and Committee Discussion**
- 10:45 am Public Comment and Opportunity to Exchange Ideas with the CC**
- 11:00 am Break**
- 11:15 am Milestone Tracking Subgroup Discussion**
- 11:30 am Lunch**
- 12:30 pm Incinerator Workgroup Informational Presentation, Committee Discussion and Feedback to Work Group**
- 1:00 pm Boilers Workgroup Informational Presentation, Committee Discussion and Feedback to Work Group**
- **Subcategories, Model Plants, MACT floors**
- 1:45 pm Boiler Workgroup Closure Presentation and Committee Discussion**
- **Pollutants of Concern**
- 2:15 pm Public Comment and Opportunity to Exchange Ideas with the CC**
- 2:30 pm Break**
- 2:45 pm Boiler Workgroup Committee Closure and Formulation of Recommendations to EPA, If Appropriate**
- **Pollutants of Concern**
- 3:15 pm Pollution Prevention Subgroup Recommendations and Committee Discussion**
- 3:45 pm Public Comment and Opportunity to Exchange Ideas with the CC**

- 4:00 pm Break (Opportunity for individuals and caucuses to confer about pollution prevention guidance)**
- 4:15 pm Formulation of Guidance to Source Work Groups on Incorporating Pollution Prevention into Regulatory Recommendations**
- 4:55 pm Overview of Tomorrow’s Agenda**
- 5:00 pm Adjourn**

Wednesday, February 25

- 9:00 am Convene and Agenda Review**
- 9:15 am Process Heaters Workgroup Closure Presentation and Committee Discussion**
 - **Workgroup Focus - Indirect Fired Heaters**
- 9:45 am Public Comment and Opportunity to Exchange Ideas with the CC**
- 10:00 am Process Heater Workgroup Committee Closure and Formulation of Recommendations to EPA, If Appropriate**
- 10:30 am Break**
- 10:45 am Process Heaters Workgroup Closure Presentation and Committee Discussion**
 - **MACT Floor for Indirect Gas/Oil-Fired Process Heaters - No “Add-on” Control**
- 11:15 am Public Comment and Opportunity to Exchange Ideas with the CC**
- 11:30 am Process Heater Workgroup Committee Closure and Formulation of Recommendations to EPA, If Appropriate**
- 12:00 noon Lunch**
- 1:00 pm Process Heaters Informational Presentation, Committee Discussion and Feedback to Work Group**
 - **Beyond the MACT Floor Considerations**
 - **Monitoring Considerations**
 - **MACT Floor for New Process Heaters**
- 2:30 pm Break**
- 3:00 pm Turbines Workgroup Informational Presentation, Committee Discussion and Feedback to Work Group**

3:30 pm	Public Comment and Opportunity to Exchange Ideas with the CC
3:45 pm	Break
4:00 pm	Economics Workgroup Informational Presentation and Committee Discussion
4:30 pm	Future Meeting Schedule and Locations
4:40 pm	Identification of Items for April Meeting
4:50 pm	Review and Approve Flash Minutes
5:00 pm	Adjourn

Attachment 2

Attendance List

**Industrial Combustion Coordinated Rulemaking
Coordinating Committee Attendance List
Tuesday, February 24, 1998**

Greg Adams
Amanda Agnew
Richard Anderson
Todd Barker
Catherine Beahm
Doug Bell
Andrew Bodnarik
Atly Brasher
Wendell Brough
Mark Bryson
Mark Calmes
Roy Carwile
Mary Beth Clary
Delbert Cline
Sam Clowney
Linda Coerr
Jan Connery
Rick Copland
Andy Counts
Jeneva Craig
Rick Crume
Kim Davis
Gerald Doddington
Donald Dowdall
Sharon Drescher
Jim Eddinger
Paul Eisele
Charles Elder
David Emery
John Fanning
Bruno Ferraro
Chuck Feerick
Klane Forsgren
Leslye Fraser
Gordon Gaetke
Mike Gallaher
Steve Gerritson

Lee Gilmer
Mahesh Gundappa
Ted Guth
Keith Harley
Terry Harrison
Bill Heater
Bruce Hedrick
Michael Hewett
Peter Hill
Michelle Huang
Tim Hunt
John Huyler
Alex Johnson
Robert Kaufmann
Chuck Keffer
John Klein
Dennis Knisley
Greg Kraft
Miriam Lev-On
Alison Ling
Joe Mackell
Jed Mandel
David Marrack
Doris Maxwell
Tom McGrath
Ruth Mead
Dave Montgomery
Norm Morrow
Vick Newsom
John Ogle
Roy Oommen
Bill O'Sullivan
Lawrence Otwell
Valerie Overton

Bob Palzer
John Paul

Janet Peargin
Bill Perdue
Fred Porter
Randy Poteet
Donald Price
Brian Quil
Brahim Richani
Sims Roy
Glenn Sappie
David Schanbacher
Marvin Schorr
Jim Seebold
John Shoaff
Jeff Shumaker
Jocelyn Siegel
Jeffrey Smith
George Smith
Jennifer Snyder
Mervyn Soares
Mike Soots
James Stumbar
Prakasam Tata
Karluss Thomas
Edwin Underwood
Dick Van Frank
Tom Walton
Bob Welch
Jeff Willis
Vladimir Zaytseff

**Industrial Combustion Coordinated Rulemaking
Coordinating Committee Attendance List
Wednesday, February 25, 1998**

Greg Adams	Lee Gilmer	Bill Perdue
Amanda Agnew	Mahesh Gundappa	Steve Phelps
Sam Allen	Ted Guth	Fred Porter
Richard Anderson	Bill Heater	Randy Poteet
Todd Barker	Dan Herndon	Donald Price
Catherine Beahm	Michael Hewett	Brian Quil
Andrew Bodnarik	Peter Hill	Brahim Richani
Michael Brand	Michelle Huang	Glenn Sappie
Atly Brasher	Jason Huckaby	David Schanbacher
Wendell Brough	Tim Hunt	Marvin Schorr
Mark Bryson	Robert Kaufmann	Jim Seebold
Mark Calmes	Chuck Keffer	John Shoaff
Roy Carwile	John Klein	Jeff Shumaker
Sam Clowney	Dennis Knisley	Jocelyn Siegel
Linda Coerr	Mary Lalley	Jeffrey Smith
Stanton Coerr	Keri Leach	Jeffrey Smith
Jan Connery	Miriam Lev-On	Jennifer Snyder
Richard Copland	Alison Ling	Mervyn Soares
Andy Counts	Joe Mackell	Mike Soots
Jeneva Craig	David Marrack	Oliver Stanley
Kim Davis	Bill Maxwell	James Stumbar
Norbert Dee	Doris Maxwell	Prakasam Tata
Gerald Doddington	Jim McCarthy	Karluss Thomas
Donald Dowdall	Diane McConkey	Dick Van Frank
Rand Drake	Tom McGrath	Tom Walton
Jim Eddinger	Ruth Mead	Bob Welch
Paul Eisele	Dave Montgomery	Jeff Willis
Charles Elder	Norm Morrow	Heather Wright
David Emery	Vick Newsom	Vladimir Zaytseff
John Fanning	John Ogle	
Chuck Feerick	Roy Oommen	
Bruno Ferraro	Bill O'Sullivan	
Klane Forsberg	Lawrence Otwell	
Leslye Fraser	Valerie Overton	
Gorodn Gaetke	Bob Palzer	
Mike Gallaher	John Paul	
Steve Gerritson	Janet Peargin	

Attachment 3

Milestone Tracking Subgroup Report

**[Additional graphs are not available in Word Perfect.
A hard copy will be in the project docket. Please
see the file "Milegraph.pdf" or .xls on the TTN]**

MEMO

To: ICCR Coordinating Committee

From: John A. Paul, Chair
Milestone Tracking Subgroup

Subject: Milestone Tracking Group Report

Date: April 2, 1998

The Milestone Tracking Subgroup met via conference call on January 9, January 23, and February 2, 1998. In preparation for the February meeting of the Coordinating Committee, we asked the Committee EPA co-chair (Fred Porter) to contact the various Work Group EPA co-chairs and ask them to update the ICCR Subgroup Tracking Sheet and the Milestone Tracking Summary Table for their Work Group. Updated ICCR Subgroup Tracking Sheets and Work Group Milestone Tracking Summary Tables are included in attachments A and B, respectively.

At the November Committee meeting, the Committee asked the Milestone Tracking Subgroup to prepare a graphical presentation of the information contained in the Work Group Milestone Tracking Summary Tables. After considering a couple of different ways to do this, the Subgroup agreed upon a format. Accordingly, you will also find a graphical display of the information contained in the Work Group Milestone Tracking Summary Table in attachment C.

The Milestone Tracking Subgroup asks each Committee member to review the attached materials. Time will be provided on the agenda for the Committee to review and discuss the overall progress and milestones of the Work Groups. If, as you review these materials in preparation for this discussion, you have some question concerning a milestone or some aspect of the summarized information, please do not hesitate to contact the appropriate Work Group Stakeholder or EPA co-chair.

Finally, the Milestone Tracking Subgroup would again like to express its appreciation for the help and assistance provided by the EPA Work Group co-chairs in preparing the attached materials.

Milestone Tracking Group Members:

John Paul	Bob Morris	Steve Gerritson
Rich Anderson	Fred Porter	Miriam Lev-On

ATTACHMENT A

SUBGROUP TRACKING SHEET

ICCR SUBGROUP TRACKING SHEET

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
COORDINATING COMMITTEE (34)	ICCR Document	6	Review draft document outlining organizational structure and administrative procedures for ICCR Advisory Committee, recommend revisions to document, and incorporate changes adopted by the Coordinating Committee (CC)	10/95-5/97	Task Complete
	ICCR Budget	14	Review estimated budget and recommend revisions	1/97-3/97	Task Complete
	Information Collection Request (ICR)	17	Review ICR developed by EPA, consider information in ICCR inventory database and Work Group recommendations, and develop a revised ICR and sampling plan, and submit revised ICR to EPA as a CC recommendation	1/97-3/97	Task Complete
	Solid Waste Definition Process	8	Review issues associated w/solid waste under Section 129 of CAA, develop recommendations on: (1) Whether CC should proceed in developing a definition, and (2) If recommendation is to proceed, the process and procedure for how to proceed.	5/97-7/97	Task Complete
	Solid Waste Definition	10-12	Develop recommendations for the definition of solid waste for purposes of section 129. Report back to CC in September. Present recommendations to CC by November.	7/97-11/97	Task Complete
	Subgroup Tracking	6	Compile a list of subgroups within the ICCR, identify their mission, and the timeframe for achieving their mission	5/97-	Active
	Pollution Prevention (P2)	18	Research specific P2 techniques applicable to combustion sources within the scope of the ICCR and, based on this research, develop recommendations and guidance for consideration by the CC on how the source WG's might incorporate P2 into regulatory recommendations. The subgroup has formed 4 working teams: (1) Input (Fuel/Waste management); (2) Device operation (GCP); (3) operator training; and (4) Output (Energy management).	11/97-2/98	Active
	ICCR Source Category Survey/Inventory Database Update	EPA only	Update ICCR inventory database with additional source inventory data obtained from States, through EPA ICR, and revisions (additions, deletions, and modifications) recommended by Work Groups	Ongoing	Active
	ICCR Emission Database Update	EPA only	Update ICCR emission database with additional source test emission test data	Ongoing	Active
TESTING AND MONITORING (21)	Cost Model	2	Develop a cost model for Source Work Groups to provide consistent test plan development	1/97-7/97	Complete

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
	Evaluation of Formaldehyde Test Issues	2	Review and summarize knowledge of formaldehyde test method issues and their potential effects on the ICCR emissions database	1/97-7/97	Complete
	Coordination w/Work Groups	5	Act as a conduit for Work Group questions on testing, POMs, cost models, etc.	Ongoing	Active
	Guidance Documents (on Non-detects, QA/QC, and test methods)	8	Provide generic guidance on evaluating the emissions data, and screening process for adding additional data in the existing emissions database	1/97-9/97	Complete
			Provide recommendations to the Source Work Groups on potential HAPs to look for in future testing	1/97-7/97	
	Compliance Methods	5	Provide guidance on future compliance methods	1/97-6/98	Active
	Monitoring	7	Provide guidance on potential monitoring options	11/97-9/98	Active
ECONOMICS (11)	None	Not Applicable	Not Applicable (NA)	NA	NA

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
IC ENGINES (23)	Emissions	18	Review emissions test data gathered in ICCR database	11/96-2/98	Active
			Develop list of pollutants and corresponding test methods	11/96-10/97	Task Complete
			Develop a test plan for future IC engines emissions testing	11/96-11/97	Task Complete
	Diesel Ad-Hoc Group	4	Review the available options for selection of a diesel unit for testing and determine which unit should be selected for testing.	11/97-5/98	Active
	Testing Ad-Hoc Group	7	Working on remaining issues related to emissions testing and coordinate with the EPA contractor for testing.	11/97-5/98	Active
	Other Fuels Ad-Hoc Group	2	Examine engines/fuels not covered by the test plan. Review the available population and emissions information on these engines and report back to the Emissions Subgroup on 1)adequacy of available data and 2) the need for additional emissions testing. In addition, will work with the Population Subgroup on these engines' preliminary MACT floor.	11/97-5/98	Active
	Next Steps Ad-Hoc Group	9	Review issues needed to move from MACT floor and test plan to a MACT Standard. 3 items: 1) define preliminary subcategories from an emissions standpoint, 2) identify applicable control technologies, 3) gather cost information on controls.	11/97-5/98	Active
	New Source MACT	3	Review issues related to developing a MACT standard for new sources.	9/97-5/98	Active
	Schedule	4	Review schedule and timeline of ICCR process, make sure group is on track.	9/97-5/98	Active
	Population and Structure Database	10	Review and enhance EPA population data for IC engines	11/96-2/98	Active
			Use data to determine subcategories, control devices, model plants, and MACT floor	11/96-2/98	
	Dioxin	6	Resolve the CC's concern about dioxin and mercury emissions from IC engines. Document findings.	7/97-11/97	Task Complete
TURBINES	Database Enhancement	4	QA and recommend changes to the inventory database, and summarize information in the database	3/97-6/98	Active
			Review emissions test data		
	Subcategory Analysis	NA	Identify potential subcategories, minimize applicable subcategories based on gathered information, and summarize the selected subcategories in a memorandum	3/97-11/97	Merged with Model Plants Task Group

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
	HAP Reduction Technologies	7	Identify good operating practices, and draft a memorandum	3/97-5/97	Active
			Investigate technologies for HAP prevention or reduction for new and existing sources, and provide an interim report.	3/97-6/98	
	HAP vs Criteria Pollutant	NA	Identify the relationship of HAPs vs. Criteria emissions, and document results	3/97-11/97	Completed work; any further analysis will be conducted by the MACT Floor Task Group
			Identify turbine factors which directly affect HAP emissions	8/97-11/97	
			Identify options for regulatory development	8/97-11/97	
	Test Methods, Monitoring, and Testing	5	Identify potential HAPs emitted from turbines, and provide a list	3/97-11/97	Active
			Draft testing protocol for HAP emissions and testing of control device efficiencies, and estimate testing budget needs	3/98	
	MACT Floor Screening	7	Develop the preliminary MACT Floor	9/97-3/98	Active
	Model Plant Development	8	Develop a group of model turbines that emulate the range of sizes and applications of combustion turbines. To support the economic analysis, develop model plants that emulate the industrial community using combustion turbines.	9/97-3/98	Active
	Task Group Planning	2	Track progress of Work Group task groups and recommend formation/closure of task groups	Ongoing	Active

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
PROCESS HEATERS (16)	De Minimis Levels	6	Develop a rational for a lower level cut-off for process heaters to be surveyed	1/97-2/97	Task Complete
	Information Collection	5	Review voluntary information collection plans for consistency with EPA's criteria	1/97-3/97	Task Complete
	Trace Constituents	6-7	Address the CCs suggestion to identify the HAPs of interest resulting from input trace constituents such as chlorine and mercury	7/97-4/98	Active
	Direct-fired process heaters	5	Develop an approach for direct-fired process heaters	11/97-2/98	Active
	Good Combustion Practice	8	Develop a definition of good combustion practices as applied to indirect-fired process heaters that may be suitable for use as a MACT floor	9/97-4/98	Active
	MACT Floor Documentation	6	Compile and develop background documentation for the MACT floor approach for gas- and liquid-fired indirect-fired heaters	1/98-2/98	Active
	Other-fired Process Heater	7	Develop a strategy to address units firing fuels other than gas and fuel oil (including fuel oil-like liquids)	1/98-6/98	Active
	Applicability Threshold	6	Develop an approach for making an applicability determination	1/98-6/98	Active
	Numeric Emission Limits	5	Investigate the feasibility of setting numeric emission limits for gas- and liquid-fired indirect-fired heaters	1/98-2/98	Active
BOILERS (38)	Fossil Fuel-Fired Boilers	17	QA and recommend changes to population database for fossil fuel fired boilers	6/97-8/97	Active
			Review emissions database, recommend changes, and recommend further testing	7/97-10/97	
			Preliminary Model Plants	9/97-3/98	
			Develop preliminary subcategories	6/97-12/97	
			List of HAPs of Concern	10/97-1/98	
			Preliminary MACT Floor Determination	1/98-3/98	
			Identify data gaps/testing needs	1/98-5/98	
BOILERS (38) (CONTINUED)	Wood-Fired Boilers	9	QA and recommend changes to population database for wood fired boilers	6/97-8/97	Active
			Review emissions database, recommend changes, and recommend further testing	7/97-2/98	
			Preliminary Model Plants	9/97-3/98	
			Develop preliminary subcategories	6/97-2/98	
			List of HAPs of Concern	10/97-1/98	
			Preliminary MACT Floor Determination	1/98-3/98	
			Identify data gaps/testing needs	1/98-5/98	

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
	Non-fossil Fuel-Fired Boilers	14	QA and recommend changes to population database	6/97-10/97	Active
			Review emissions database, recommend changes, and recommend further testing	7/97-10/97	
			Preliminary Model Plants	9/97-3/98	
			Develop preliminary subcategories	6/97-2/98	
			List of HAPs of Concern	10/97-2/98	
			Preliminary MACT Floor Determination	1/98-3/98	
			Identify data gaps/testing needs	1/98-5/98	
	State Regulation	5	Obtain relevant information from States to characterize limits and controls for boilers	5/97-9/97	InActive
			Develop a database of relevant State information to be combined with inventory information	In planning	
	Waste Definition	5	Develop preliminary recommendations for a definition of solid waste	5/97-	InActive

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
INCINERATORS (30)	Subgroup 1	8	Determine which combustion units are in the ICWI category and to identify sources of ICWI inventory and emission data readily available, both from the EPA database and other sources	11/96-12/96	Task Complete
	Subgroup 2	6	Determine what sources, other than ICWI, are in the incinerator category and to begin an inventory of incinerators. The inventory of incinerators will be used to determine which facilities will receive the questionnaire.	11/96-12/96	Task Complete
	Information Collection	4	Work with the Boiler and Process Heater Work Groups and Coordinating Committee to determine how to best collect the necessary information for the ICCR database	1/97-4/97	Task Complete
	Scoping	4	Determine the scope of Work Group (addressing such issues as flares and metal recovery units), and documenting the arguments of those units that should be of lower priority or should be addressed by EPA under other rulemakings	1/97-3/97	Task Complete
	Definition of Solid Waste	10	Work with Boiler and Process Heater Work Groups to develop a definition of solid waste to be used in the ICCR.	1/97-7/97	InActive
	Subteam 1 (Pathological, Including Crematory, Wastes)	7	Identify database entries that belong in the subgroup and which belong in another subgroup, another Work Group, or not in the ICCR	3/97- 11/97	Active
			QA inventory and emissions databases, and determine data gaps that may be filled by additional questionnaires and by testing	3/97- 2/98	
			Develop recommendations for subcategories, floors, model units, and control options	6/97-8/98	

ICCR SUBGROUP TRACKING SHEET (CONTINUED)

GROUP/ (Number of members)	Subgroup Information				
	Name	Number of Members	Mission/Goal/Products	Timeline	Status
INCINERATORS (30) (CONTINUED)	Subteam 2 (Chemical, Petroleum, and Pharmaceutical Solids, Liquids, and Sludges; LGFs)	8	Identify database entries that belong in the subgroup and which belong in another subgroup, another Work Group, or not in the ICCR	3/97- 11/97	Active
			QA inventory and emissions databases, and determine data gaps that may be filled by additional questionnaires and by testing	3/97- 2/98	
			Develop recommendations for subcategories , floors, model units, and control options	6/97-8/98	
	Subteam 3 (Wood, Construction, Demolition, and Agricultural Wastes)	5	Identify database entries that belong in the subgroup and which belong in another subgroup, another Work Group, or not in the ICCR	3/97- 11/97	Active
			QA inventory and emissions databases, and determine data gaps that may be filled by additional questionnaires and by testing	3/97- 2/98	
			Develop recommendations for subcategories , floors, model units, and control options	6/97-8/98	
	Subteam 4 (Drum and Parts Reclaimer Units, Scrap Metal Recovery)	4	Identify database entries that belong in the subgroup and which belong in another subgroup, another Work Group, or not in the ICCR	3/97- 11/97	Active
			QA inventory and emissions databases, and determine data gaps that may be filled by additional questionnaires and by testing	3/97- 2/98	
			Develop recommendations for subcategories , floors, model units, and control options	6/97-8/98	
	Subgroup 5 (Formerly Small Municipal Waste Combustors, Landfill Gas Flares, Agricultural, Concrete, and Fiberglass)	6	Identify database entries that belong in the subgroup and which belong in another subgroup, another Work Group, or not in the ICCR	3/97-6/97	InActive (assigned to other subteams)
			QA inventory and emissions databases, and determine data gaps that may be filled by additional questionnaires and by testing	3/97-10/97	
			Develop recommendations for subcategories , floors, model units, and control options	3/97-9/97	
	Waste definition support group	10	Provide support to the 2 Work Group members who are on the Coordinating Committee Solid Waste Definition Subgroup	7/97- 2/98	Active

ATTACHMENT B

MILESTONE TRACKING SUMMARY TABLE

MILESTONE TRACKING SUMMARY TABLE

Incinerator Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	12/98 -- The IWG subteams are in various stages of data analysis. Some are hampered by lack of waste information that should become available with release of the corrected ICR results. All subteams expect to complete definition of subcategories, based on materials combusted, in January or February of 1998. Emission data collection and analysis will continue in parallel with the next steps throughout 1998.
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	6/98 -- Source subcategorization by size, construction, or other characteristics and preliminary MACT floor determinations are expected by May of 1998 for most IWG subcategories. For a few subcategories, where test data is required, some delay beyond this timeframe is possible. For subcategories where the databases provide clear answers, and where technology will be the basis, the preliminary MACT floor determination may be completed in early 1998.
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	8/98 -- Preliminary regulatory alternatives for ICWI subcategories are expected in July 1998, in time for submission to the Coordinating Committee (CC) for review, prior to CC submittal to EPA in August. For other source categories, preliminary regulatory alternatives are expected in August 1998.
Regulatory Analysis Cost Analyses Economic Analysis Emission Reduction Assessment	3/98-8/98	2/99 -- Regulatory analysis for ICWI subcategories should be completed by February 1999. Other subcategory analyses will follow 4-6 months later.
Preliminary Regulatory Recommendations	9/98	5/99 -- A draft proposal for submission to EPA is expected for ICWI subcategories in May 1999 and 4-6 months later for the other subcategories.

MILESTONE TRACKING SUMMARY TABLE (Continued)

Boilers Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	2/98 -- Has begun, expected completion date 2/98. (However, this milestone includes only review of inventory and emission databases, identification of data gaps, and recommendations for testing - results from test program are <u>not</u> expected before 8/98. Also does not include obtaining emission data from identified ICR respondents which would be in 4/98 timeframe.).
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	2/98 -- Has begun, expected completion date for preliminary MACT floor is 2/98. Preliminary subcategories and preliminary model plants are currently being developed by each subgroup - expected completion date for these milestones is 12/98.
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	5/98-- Control Technology Assessment begin 12/97 and is expected to be complete in 5/98. 5/98-- Identification of regulatory alternatives is expected to start 2/98, be completed by 5/98
Regulatory Analysis Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	Not started. 5/98 -- Cost and environmental impact analysis will begin in 3/98 and is expected to be complete in 5/98. 9/98 -- Economic impact analysis will begin in 5/98 and is expected to be complete in 9/98.
Preliminary Regulatory Recommendations	9/98	10/98-- Not started, is expected to start 7/98, be completed by 10/98, and is (Work group's preliminary recommendation - 8/98).

MILESTONE TRACKING SUMMARY TABLE (Continued)

Turbine Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	8/97 -- The Database Enhancement Task Group completed QA/QC efforts of the Inventory Database in August '97. 3/98 -- The Testing Methods, monitoring, and Testing Task Group completed QA/QA efforts of the Emissions Database (of gathered reports) in August '97. Currently gathering additional test reports from state files and WG members which is expected to be completed by March '98. 3/98 -- Final list of HAPs to be measured was submitted in November '97. Currently in the process of developing a test plan. Drafted a preliminary estimate of testing needs which will be revised subsequent to finalizing the test plan. Testing recommendations will be completed in March '98. 9/98 -- Testing to determine HAP control efficiency of control devices to be completed in September '98. The final emissions database for controlled sources is scheduled for completion in November '98 after testing has been completed.
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	7/97 -- The Subcategorization Task Group drafted a memorandum of potential subcategories in July '97. Subcategories may be developed based on model plants analyses. 3/98 -- Preliminary MACT Floor for existing sources (using the current emissions database) was completed in December '97. MACT Floor for existing sources to be completed in March '98. 9/98 -- MACT Floor for new sources is scheduled for completion in September '98, subsequent to gathering additional source tests and any WG testing efforts. 3/98 -- Initiated efforts in developing model plants. Identified a Model Plants Task Group during the WG's September meeting. Model plant information will be finalized and provided to the Economic Analysis Work Group by March '98.

MILESTONE TRACKING SUMMARY TABLE (Continued)

Turbine Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	5/97 -- The HAP Reduction Technology Task Group submitted a draft memorandum of Good Operating Practices in May '97. 7/97 -- A Technology Work Shop was held on July 25, 1997, to identify potential HAP control technologies. 6/98 -- An intermediate report listing HAP reduction and prevention technologies is scheduled for submittal in June '98. 9/98 -- Final regulatory alternatives will be submitted in September '98.
Regulatory Analysis Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	3/98 -- The WG has not assigned a task group to review Cost Analyses. The WG initiated efforts in conducting literature searches of existing cost data for applicable controls. 5/98 -- Cost analysis for existing and new sources will be completed in May '98. 11/98-- Economic Analysis and Emission Reduction Assessment is scheduled for completion by November '98.
Preliminary Regulatory Recommendations	9/98	12/98-- The HAPs vs. Criteria Task Group is in the process of identifying options for regulatory development. To date, no documentation has been drafted for regulatory options. The task group reviewed information on HAPs vs. Criteria emissions as a function of turbine operating parameters. Selection of Regulatory Alternatives will be completed by December '98.

MILESTONE TRACKING SUMMARY TABLE (Continued)

IC Engines Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	1/98 -- The Population Subgroup completed QA/QC efforts of the Inventory Database in August '97. Based on comments from INGAA, additional modifications were completed and posted on the TTN in January '98. 2/98 -- The Emissions Subgroup completed QA/QC efforts of the Emissions Database (of gathered reports) in July '97. Additional test reports were gathered from state files and WG members, and a Version 2 of the Emissions Database will be posted on the TTN in February '98. The final database will include emissions data for all testing conducted according to the WG's test plan, and is scheduled for completion in June '98. 11/97-- Final test plan and testing site recommendations were presented to the CC in November, '97. The CC has elevated two issues to EPA management for resolution.
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	2/98 -- The Population Subgroup developed potential subcategories for RICE in July '97. Preliminary subcategories as well as a preliminary MACT floor (existing sources) will be discussed at the WG in February '98. An Other Fuels Subgroup, a Diesel Subgroup, and a Testing Subgroup were formed to work towards these goals. 4/98 -- Model plant development was initiated at the November meeting. A task group has not yet been formed. Completion date is scheduled for April '98. 8/98 -- MACT floor determination for new sources is scheduled for completion in August '98, subsequent to gathering additional source tests reports from states, WG members, and the WG testing efforts conducted in accordance with the approved test plan. A New Source MACT Subgroup was created in September '97.

MILESTONE TRACKING SUMMARY TABLE (Continued)

IC Engines Work Group		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	7/97 -- The Emissions Subgroup developed a list of potential HAP reduction technologies (presented at the July '97 WG meeting.) Feasibility for such controls has yet to be initiated. 8/98 -- Final regulatory alternatives will be submitted in August '98.
Regulatory Analysis Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	5/98 -- The WG has not yet assigned a task group to review Cost Analysis. 5/98 -- Cost analysis for existing and new sources will be completed in May '98. 11/98-- Economic Analysis and Emission Reduction Assessment is scheduled for completion by November '98.
Preliminary Regulatory Recommendations	9/98	2/98 -- Regulatory Recommendations have yet to be initiated. Efforts will be initiated in February '98. 12/98-- Selection of Regulatory Alternatives will be completed by December '98.

MILESTONE TRACKING SUMMARY TABLE (Continued)

Process Heaters (Indirect gas- and liquid-fired units)		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	2/98 -- The inventory database has been reviewed and the work group is awaiting the revised version for any further review necessary. The work group is also awaiting receipt of emissions database for review. 2/98 -- No emission test recommendations have been identified. Expected completion date: 2/98.
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	3/97 -- Subcategorization into gas- and other-fired units has been completed. 1/98 -- Subcategories defined as "gas and liquid" and "other" fired 2/98 -- The determination of whether model plants are necessary is ongoing. Expected completion date: 2/98.
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	3/97 -- This determination has been completed (no control technology other than "good combustion practice" and NOx controls). 2/98 -- Determination of any "beyond the floor" alternatives is being explored by the "Good combustion practice" subgroup. Expected completion date: 2/98.
Regulatory Analysis Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	2/98 -- Review material from Economics Work Group. 8/98 -- Expected completion date: 8/98.
Preliminary Regulatory Recommendations	9/98	Expected completion date: 9/98.

MILESTONE TRACKING SUMMARY TABLE (Continued)

Process Heaters (Other-fired units)		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	2/98 -- The inventory database has been reviewed and the work group is awaiting the revised version for any further review necessary. The work group is also awaiting receipt of the emissions and ICR databases for review. 4/98 -- Any emission test recommendations are expected by 4/98. Expected completion date: 4/98.
MACT Floor Determination Source Subcategorization Model Plant Development	9/97-11/97	2/98 -- The work group is awaiting receipt of the ICR database. 4/98 -- The determination of whether model plants are necessary is ongoing. Expected completion date: 4/98.
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	4/98 -- The control technology assessment is being evaluated by the "Good combustion practice" subgroup. 4/98 -- Determination of any "beyond the floor" alternatives is being explored by the "Good combustion practice" subgroup. Expected completion date: 4/98.
Regulatory Analysis Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	2/98 -- Review material from Economics Work Group. 8/98 -- Expected completion date: 8/98

MILESTONE TRACKING SUMMARY TABLE (Continued)

Process Heaters (Other-fired units)		
Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Preliminary Regulatory Recommendations	9/98	Expected completion date: 9/98.

1. Major milestones are shown in bold type. Some recommended submilestones are also listed.
2. Indicate the current status of the milestone (i.e., whether it has begun, is in data gathering stage, etc.), the expected date to complete the milestone, and, if appropriate, the group or subgroup responsible for completing the milestone.

ATTACHMENT C

STONE TRACKING SUMMARY GRAPHS

See file **milgraph.xls** or **milgraph.pdf** for graphs

Attachment 4

Incinerator Work Group Status Report

Status Report
Incinerator Work Group
February 13, 1998

Since the November meeting of the Coordinating Committee, the Incinerator Work Group (IWG) has had several teleconferences and has met once in Orlando, Florida. The IWG continues to focus on developing and refining its subcategories and analyzing information in the inventory, emissions, and survey databases. Several of the IWG's subteams have begun to define model unit parameters, and MACT floor discussions are underway in each of the subteams. Our current schedule calls for completing the following milestones by the dates indicated:

- **March 12** — *Preliminary MACT floors for most of our subcategories*
- **May 28** — *Preliminary regulatory alternatives for most of our subcategories*
- **July 28** — *Draft regulatory alternatives paper (RAP) for submittal to the Coordinating Committee at its July 28 & 29 meeting*

This is a very ambitious schedule, but we are committed to making as much progress as possible towards achieving these milestones and completing a draft RAP by the end of July. We are especially interested in doing a good job on the RAP because it will lay out in detail our progress to date, giving the Coordinating Committee the opportunity to examine all of our assumptions, procedures, and conclusions. Because the boiler work group (BWG) may be responsible for some units that fall under section 129, we will be briefing the BWG at their February 26 meeting on our plans for the RAP and requesting their assistance in preparing information for any section 129 boiler subcategories.

At this time we contemplate a single solid waste incineration rulemaking package (i.e., preamble and regulation) that presents sets of emission limits for each of our subcategories. Although we have a long way to go before emission limits can be developed, we have already drafted preliminary waste definition and applicability language for our subcategories, and work on this language will continue throughout the spring and summer. A detailed IWG schedule has been prepared that addresses each of the milestones listed in the ICCR *Organizational Structure and Process* document (pages 69 through 73). This will serve as guidance to the IWG, helping us to keep our work on schedule.

To facilitate work on individual subcategories, the IWG continues to maintain its subteam structure. Each of the four subteams is responsible for developing recommended MACT floors and regulatory alternatives for its subcategories and reporting back to the full IWG. In addition to meeting during scheduled IWG meetings, the subteams meet separately at other times and conduct periodic teleconferences. Each IWG member is expected to serve on a subteam and contribute to the overall process, even if he or she cannot attend every IWG meeting. Teleconferences involving the subteam leaders and IWG Co-chairs are periodically scheduled for the purpose of coordinating subteam and IWG activities.

Recently the IWG contacted several members who have not been attending meetings and asked them if they wish to stay involved with the work group. As a result, three IWG members have asked to have their names withdrawn, citing job conflicts that prevent them from actively participating on the IWG. A fourth IWG member has retired from work and has asked that his Alternate on the IWG replace him.

Future IWG meetings are tentatively scheduled as follows:

- **March 11 & 12** — *Durham, North Carolina*
- **April 7** — *Washington, DC*
- **May 27 & 28** — *Durham, North Carolina*

The first day of the meetings in March and May will be devoted entirely to subteam discussions, and the second day of these meetings will involve the entire work group. The April 7 meeting will involve the entire work group.

Attached for your information are: (1) the IWG's draft RAP outline, (2) a flow chart entitled *Where Do We Go From Here* that illustrates the three parallel paths we are currently following for the purpose of preparing a draft RAP by July, and (3) a table identifying the IWG's four subteams. Additionally, we refer you to our flash and full minutes from our February 5, 1998 meeting, which are posted on the IWG's web page under *Minutes of Previous Meetings*. These minutes provide additional background of our progress and plans to date.

Norm Morrow
Richard Crume
February 13, 1998

DRAFT OUTLINE REGULATORY ALTERNATIVES PAPER

February 13, 1998

FORMAT: *Transmittal letter and attached paper with appendix, two-sided, single-spaced, times new roman, 12 pt.*

Transmittal Letter (*one page*) — *John Devine*

1.0 INTRODUCTION (*one to two paragraphs*) — *Rick Crume*

- Brief introduction to the ICCR and the IWG (figure of ICCR organization).
- Purpose and organization of this document.
- (Explain that the RAP represents an intermediate step in the standards development process and work continues.)

2.0 BACKGROUND (*three to four paragraphs*) — *Rick Crume*

- Review of approach taken to develop regulatory alternatives and progress made to date (figure of subteam organization).
- Overview of anticipated regulatory framework, including distinction between ICWI and OSWI (figure of potential regulatory structure).
- Brief review of evolution of solid waste definition.
- (Explain that some subcategory and regulatory alternative characterizations are incomplete and that revisions and refinements will continue as new information is received (e.g., from source tests); specific needs and issues will be summarized in the subcategory characterizations presented below.)

3.0 APPLICABILITY (*two or three paragraphs*) — *Rick Crume and Jim Eddinger*

- Subcategories and any groupings within subcategories (list or table).
- Applicability to miscellaneous wastes (e.g., <30% MSW, <10% HMIW, and any undefined or unknown wastes).
- Restatement of what is not covered (e.g., RCRA, MWC, and HMIWI units).
- Basis for deciding which boilers and process heaters to include.

4.0 SUBCATEGORY CHARACTERIZATIONS AND REGULATORY

ALTERNATIVES (*separate one- to two-page summary sheets for each subcategory or subcategory grouping*) — *IWG subteams/BWG subgroups*

- Subcategory characterizations and emission control options (including pollution prevention) to be summarized in an appendix, with a separate summary sheet for each subcategory or subcategory grouping.
- The information in the appendix will be summarized in a table (see attached example) — *Rick Crume and Jim Eddinger*.

5.0 ISSUES AND NEEDS (*several paragraphs*) — *Norm Morrow and Jim Stumbar*

- Summary of the issues and needs that we are facing (e.g., lack of emissions test data for some subcategories), the steps we are taking to address these issues and needs, and any possible delays to our schedule.
- (This section will ensure that the CC understands the challenges we face in developing standards for a large number of subcategories over a relatively short time period.)

6.0 STEPS TAKEN TO IMPLEMENT STATUTES AND EXECUTIVE ORDERS

(*several paragraphs*) — *John Devine*

- Review of the steps being taken by the IWG and/or the CC to address the various statutes and executive orders, including provisions covering pollution prevention, environmental justice, public participation, and small business impacts.
- (This section will ensure that the CC is aware of the steps we are taking to implement the statutes and EOs. If there are any problems with our approach, we want to learn about them far enough in advance of proposal to make adjustments.)

EXAMPLE SUBCATEGORY CHARACTERIZATION AND REGULATORY
ALTERNATIVES SUMMARY TABLE

SUBCATEGORY	GROUPING	WASTE	ICWI or OSWI	FLOOR LEVEL OF CONTROL	ALTERNATIVES ABOVE FLOOR	POLLUTANTS TO BE REGULATED	COMMENTS
Whozit Industry	Small whozits (smaller than 5 ton/day)	Waste whozit trimings	ICWI	No control	1. Good operating practices 2. Cyclone 3. Venturi scrubber	Section 129 pollutants	Discussions with equipment vendors and manufacturers underway to investigate more cost-effective control options
”	Large whozits (greater than 5 ton/day)	Waste whozit trimings	ICWI	Good operating and mainten- ance practices	1. Cyclone 2. Venturi scrubber 3. Spray dryer	Section 129 pollutants	Conclusions regarding control options may be revised once emission test program is completed

Note: any pollution prevention control alternatives and environmental justice approaches would also be included in the table.

SUBCATEGORY INFORMATION SHEET FOR RAP APPENDIX

FORMAT: *A separate sheet is to be prepared for each subcategory or subcategory grouping. The sheets are intended to closely follow the format already established for our subcategory definitions. However, additional information will need to be added to our existing format to address the requirements of the RAP, as noted below (new information is underlined.) The sheets will probably be about two pages in length and may include tables and/or figures. Database summary tables (summaries of inventory, emissions, and ICR/survey database information) incorporated with the current definitions should be retained and can be placed under the STATUS OF DATA COLLECTION AND ANALYSIS category. An advantage of retaining, but expanding, the current subcategory definition format is that portions of the expanded format could form the basis of the subcategory description sections to be incorporated into a background information document that will probably be needed to support the rulemaking.*

SUBCATEGORY NAME:

ASSIGNED CAA SECTION (ICWI OR OSWI):

GROUPING WITHIN SUBCATEGORY:

POPULATION STATISTICS:

MATERIAL COMBUSTED:

COMBUSTION DEVICE:

BASIS FOR SUBCATEGORY BOUNDS:

POLLUTANTS CONSIDERED FOR REGULATION:

FLOOR LEVEL OF CONTROL:

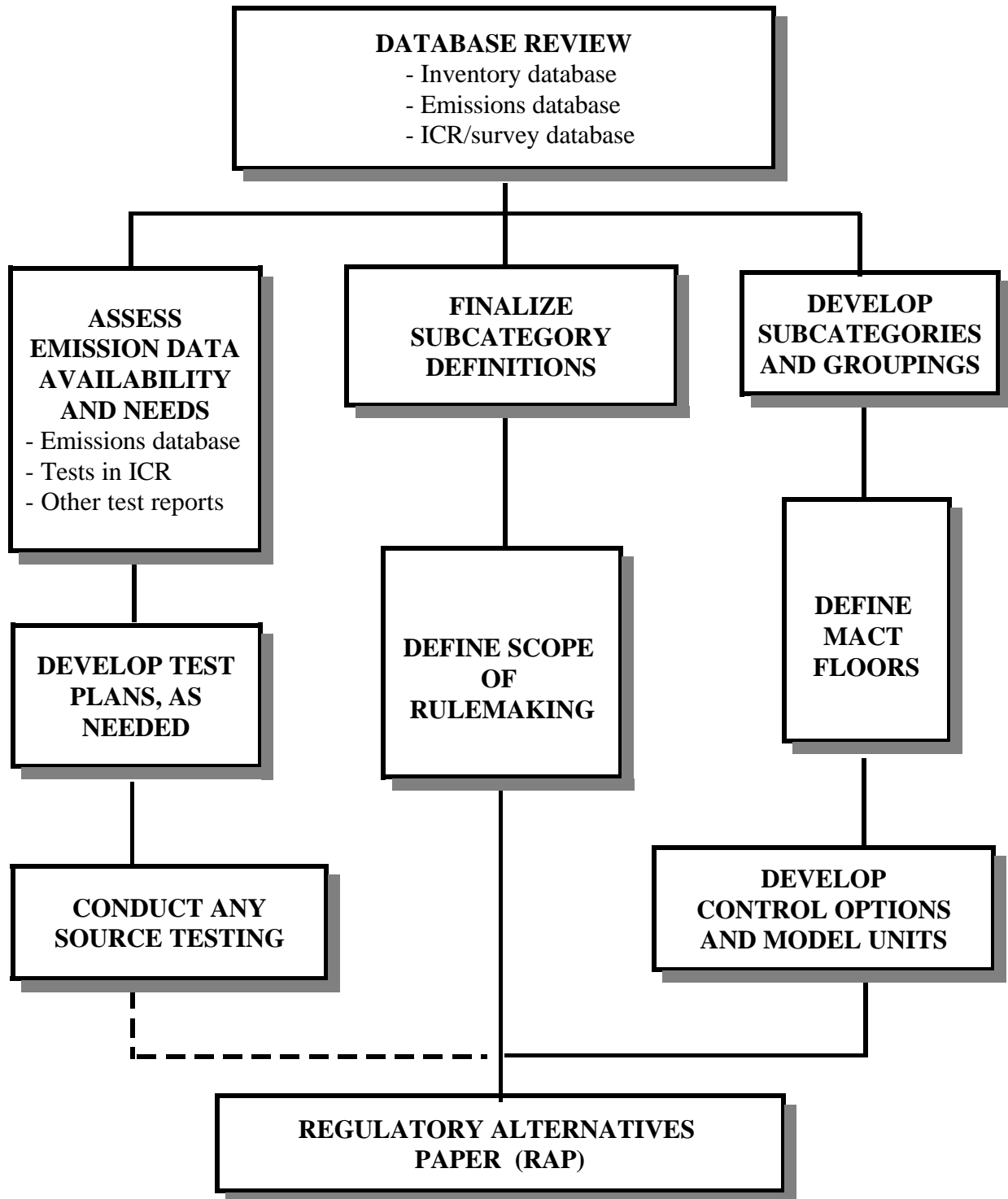
REGULATORY ALTERNATIVES ABOVE FLOOR:

STATUS OF DATA COLLECTION AND ANALYSIS:

ISSUES AND NEEDS:

OTHER COMMENTS:

WHERE DO WE GO FROM HERE?



INCINERATOR WORKGROUP SUBTEAMS

<u>Subteam 1.</u> Pathological (including crematory) wastes	<u>Subteam 2.</u> Chemical, petroleum, and pharmaceutical solids, liquids, and sludges; LGFs	<u>Subteam 3.</u> Wood, construction, demolition, agricultural wastes	<u>Subteam 4.</u> Drum and parts reclaimer units, scrap metal recovery
Paul Rahill (lead)	Bob Morris (lead)	Dave Maddox (lead)	Andy Roth (lead)
Lawrence Doucet	Ethan Begg	George Parris	Brian Dittberner
Ruth Mahr	Beth Berglund	Bill Perdue	Kay Rykowski
David Marrack	Larry Faith	Jeff Shumaker	Tom Tyler
Larry Thompson	Doug Finan	Dick Van Frank	Dana Worcester (alt. to Kay Rykowski)
Dale Walter	Tony Licata		
Bill Wiley	Norm Morrow		
	Ed Repa		
	Ed Wheless		

Rick Crume will providing support to all four subteams while tracking the “miscellaneous” category.
Updated 1/14/98.

Attachment 5

RICE Status Report with Milestone Table

THE IC ENGINE WORK GROUP STATUS REPORT - FEBRUARY 9, 1998

EMISSIONS SUBGROUP:

Accomplishments since last meeting:

Since the November meeting of the Coordinating Committee, the Emissions Subgroup has continued to work on implementation of the RICE Test Plan, through two ad-hoc groups: the Diesel Ad-Hoc Group and the Testing Issues Ad-Hoc Group. In addition, the Subgroup has formed an ad-hoc group to review the fuels not covered by the RICE Test Plan (the Other Fuels Ad-Hoc Group) and an ad-hoc group to review above-the-floor MACT alternatives (the Next Steps Ad-Hoc Group).

The Diesel Ad-Hoc Group was established to review the available options for selection of a diesel unit for testing. Since the November CC meeting, the Diesel Ad-Hoc Group has arranged for the loan of the diesel engine specified in the RICE Test Plan (a Caterpillar 3500 series). The diesel engine will be provided by Caterpillar and will be installed at the Engines and Energy Conversion Laboratory at Colorado State University (CSU), Fort Collins, Colorado.

The Testing Issues Ad-Hoc Group was established to work on the remaining issues related to emissions testing and to coordinate implementation of the RICE Test Plan with the EPA testing contractor. Since the November CC meeting, the group has developed a preliminary schedule for the RICE emissions testing at CSU and has worked with the EPA Emissions Monitoring Division (EMD) on the remaining testing issues.

The Other Fuels Ad-Hoc Group was established to review MACT issues for engines using fuels other than natural gas and diesel. These "other" fuels are not addressed in the current RICE Test Plan. The group is in the process of reviewing the available population and emissions information for engines using other fuels. The group also will work with the Population Subgroup on the preliminary MACT floor for engines using other fuels.

The Next Steps Ad-Hoc Group was established to begin work on above-the-floor MACT alternatives. The group currently is focused on the following three components of the above-the-floor MACT analysis: 1) preliminary subcategories, 2) applicable above-the-floor control technologies, and 3) cost information on controls. In addition, the group is beginning work on development of model units that would be used to evaluate above-the-floor MACT alternatives.

Current focus of tasks and activities for the work group:

The Emissions Subgroup is currently focused on the implementation of the RICE Test Plan and development of above-the-floor MACT alternatives.

Plans and objectives for work group between February and April:

The Emissions Subgroup will continue on the next steps to conduct the emissions testing outlined in the RICE Test Plan and to address engines using fuels other than natural gas and diesel fuel. In addition, the Subgroup will continue to develop information to evaluate above-the-floor MACT alternatives.

POPULATION SUBGROUP:

The population subgroup continues to make progress towards defining a preliminary MACT floors.

The work activities included:

- 1) USEPA provided written response to INGAA's comments for enhancing the database. Many of INGAA's suggestions and changes were made to the engine information.
- 2) Developed a new engine subcategorization chart. This PowerPoint chart provides a quick review of engine subcategorization based on the USEPA database.
- 3) Engine type statistical information and impact of INGAA's changes to the USEPA database.
- 4) An updated version of the RICE database is now available for review on the TTN.

We are making progress toward our next goals of:

- 1) Reviewing other data sources to determine how representative the USEPA database is,
- 2) Determining the types of catalytic controls used on different engines.

The Population Subgroup will hold a teleconference on February 4th to discuss direction toward: 1) MACT floor determinations, 2) Database representatives, and 3) Catalytic controls and engine types.

MILESTONE TRACKING SUMMARY

Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection (50% complete) Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	<ul style="list-style-type: none"> - The Population Subgroup completed QA/QC efforts of the Inventory Database in August '97. Based on comments from INGAA, additional modifications were completed and posted on the TTN in January '98. - The Emissions Subgroup completed QA/QC efforts of the Emissions Database (of gathered reports) in July '97. Additional test reports were gathered from state files and WG members, and a Version 2 of the Emissions Database will be posted on the TTN in February '98. The final database will include emissions data for all testing conducted according to the WG's test plan, and is scheduled for completion in October '98. - Final test plan and testing site recommendations were presented to the CC in November, '97. The CC has elevated two issues to EPA management for resolution.
MACT Floor Determination (30% complete) Source Subcategorization Model Plant Development	9/97-11/97	<ul style="list-style-type: none"> - The Population Subgroup developed potential subcategories for RICE in July '97. Preliminary subcategories as well as a preliminary MACT floor (existing sources) will be discussed at the WG in February '98. An Other Fuels Subgroup, a Diesel Subgroup, and a Testing Subgroup were formed to work towards these goals. - Model plant development was initiated at the November meeting. A task group has not yet been formed. Completion date is scheduled for April '98. - MACT floor determination for new sources is scheduled for completion in August '98, subsequent to gathering additional source tests reports from states, WG members, and the WG testing efforts conducted in accordance with the approved test plan.
Identification of Regulatory Alternatives (20% complete) Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	<ul style="list-style-type: none"> - The Emissions Subgroup developed a list of potential HAP reduction technologies (presented at the July '97 WG meeting.) Feasibility for such controls has yet to be initiated. - Final regulatory alternatives will be submitted in August '98. - A New Source MACT Subgroup was created in September '97.
Regulatory Analysis (0 % complete) Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	<ul style="list-style-type: none"> - The WG has not yet assigned a task group to review Cost Analysis. - Cost analysis for existing and new sources will be completed in May '98. - Economic Analysis and Emission Reduction Assessment is scheduled for completion by November '98.

MILESTONE TRACKING SUMMARY

Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Preliminary Regulatory Recommendations (0% complete)	9/98	<ul style="list-style-type: none"> - Regulatory Recommendations have yet to be initiated. Efforts will be initiated in February '98. - Selection of Regulatory Alternatives will be completed by December '98.

1 Major milestones are shown in bold type. Some recommended submilestones are also listed.

2 Indicate the current status of the milestone (i.e., whether it has begun, is in data gathering stage, etc.), the expected date to complete the milestone, and, if appropriate, the group or subgroup responsible for completing the milestone.

Attachment 6

Combustion Turbine Status Report

January 26, 1997

**Stationary Combustion Turbine Work Group
Status Report to the ICCR CC
February 10, 1998**

I. Meetings and Teleconferences

Since the last status report dated November 7, 1997, the Combustion Turbines Work Group (CTWG) met on November 20, 1997, for a one day meeting in Houston, TX and on December 10, 1997 and January 21, 1998 for two hour teleconferences.

II. Status

At the November CC meeting, the CTWG presented the list of pollutants to test for by fuel type to the CC. Closure was reached on the list of pollutants to test for; however, consensus was not reached on the pollutant list for landfill gas. Therefore, majority and minority opinions were both presented to the CC. The CC recommended elevating the non-consensus issue to the EPA level and created a six person subgroup to draft a position paper. CTWG members Ted Guth, Greg Adams, and Sims Roy served on this group. This group came to closure on this paper, and it was submitted to EPA for resolution.

Summaries of the activities and status of the CTWG task groups since the last report to the CC are listed below:

(I)- EPA Database and Enhancement Task Group- This task group is responsible for reviewing/enhancing the Stationary Combustion Turbine Population and Emissions Databases. The activities conducted on each database are presented below.

Population Database:

No new activities were conducted on the population database. The final database was completed according to schedule. The database will be utilized in the future when needed.

Emissions Database:

The emissions database was posted on the TTN on January 8, 1998, ahead of the schedule set forth in the Combustion Turbines MACT Development Timeline. The "Test Data" table was subdivided into three sections: 1) HAPs emissions data, 2) criteria emissions data, and 3) tests with both HAPs and criteria emissions data.

Facilities which indicated they have HAPs data for gas turbines in the Boiler and Incinerator ICR are currently being contacted for complete copies of their HAP test reports. If any reports are found through this process, they will be reviewed and added to the emissions database if they meet the acceptance criteria.

(II)- Subcategory Analysis Task Group- This task group was merged with the Model Plant Task Group during the Model Plant Task Group's December 13, 1997 teleconference. (See Section VII)

(III) HAP Reduction Technology Task Group- No new activities were conducted under this task group since the last report to the CC.

(IV) HAP vs. Criteria Pollutant Task Group- The task group held a teleconference on November 13, 1997. The group's review of the existing data suggest that NO_x control by steam injection causes an increase in formaldehyde. However, the group indicated that due to the limited data that are available on HAPs vs. NO_x, the strength of this relationship warrants further investigation. It was found that CO is a good indicator of combustion conditions, but no trend relating CO to HAPs could be identified. Low CO appears to correspond to good combustion and low HAPs, but high CO does not necessarily mean high HAPs. Therefore, it was agreed that CO may not be a reliable surrogate for HAPs.

Charles Chang resigned as chair of the task group at the November teleconference. The task group decided not to appoint a new chairperson because the task group has gone as far as it can in analyzing this issue at this time. The task group decided that they would meet on an ad hoc basis in the future if needed. Trade-off issues between HAPs and criteria pollutants that arise when developing MACT will be discussed at that time.

(V) Test Methods Monitoring and Testing Task Group- The list of pollutants to be measured by fuel type was developed by the task group and presented to the CC at the November meeting. Closure was reached on the recommended list of pollutants to measure from turbines for each fuel type. Consensus was reached on not including dioxin on the HAP list for each fuel except landfill gas. For landfill gas, there was a non-consensus on whether dioxin should be tested. The minority and majority positions were presented to the CC at the November meeting concerning the inclusion of dioxin on the pollutant list for turbines firing landfill gas. This issue could not be resolved by the CC and was sent to EPA for resolution.

At the November CTWG meeting, the task group distributed a preliminary draft testing protocol to WG members. CTWG members submitted comments on the test plan. In addition, comments were received from Terry Harrison of EPA's Emission Measurement Center and additional comments are anticipated from the Testing and Monitoring Protocol Work Group. Prior to the CTWG meeting in February, a revised test plan, including the incorporation of WG members' comments, will be e-mailed to WG members with draft responses to the comments received from both Terry Harrison and the TMPWG.

Current and future activities of the the task group include submitting the testing protocol to the TMPWG for cost estimates and conducting source testing. The task group will be establishing a process by which to select facilities for testing should no facilities volunteer. Many members have expressed concern that it will be difficult to elicit volunteers for testing unless protection against enforcement for non-compliance during testing is guaranteed. This possibility is currently being investigated.

The task group provided comments to API and GRI concerning their upcoming plans to test a gas turbine. Changes were made in the testing program that take into consideration requests made by the task group. The test will occur during the first week in March, 1998. Task group members Gordon Brown and Sims Roy plan to attend the test.

(VI) MACT Floor Task Group- The task group held a teleconference on December 17, 1997 to discuss the preliminary MACT floor determination. Sims Roy presented the draft MACT floor for existing sources to

task group members and to other guests. A narrative is currently being prepared to document the rationale used develop at the preliminary MACT floor.

The task group held another teleconference on January 16, 1998. Task group members questioned the practicality of imposing an emission limit as the MACT floor for turbines. The legal obligation and rationale mandating that an emission limit be set as the MACT floor is currently being reviewed by OGC. In addition, the MACT floor development process being followed by other source work groups is being investigated by the CTWG. A teleconference was held on January 27, 1998 in which Fred Porter discussed the Process Heater Work Group's (PHWG's) approach in developing a numerical MACT floor limitation. CTWG members agreed in principle that they could support the PHWG's MACT Floor development process and would sit at the table during the PHWG's MACT Floor presentation at the February CC meeting.

(VII) Model Plant Development Task Group- On December 16, 1997, the task group met via teleconference with the Economic Analysis Work Group (EAWG) to discuss and understand their data needs (reference: Table 1 and 2 of October 29, 1997 memo from Mike Gallaher to Sims Roy). Many questions were answered in terms of scope of effort, level of detail, and how costs are developed. The task group will develop control costs for each model plant and then be prepared to work with EAWG.

On January 13, 1998, the task group held a teleconference to discuss a draft table of model plants. A list of turbine characteristics were reviewed in terms of their impact on HAP emission control techniques. A short list of characteristics (e.g., unit size, hours of operation, heat recovery, new vs. retrofit) were organized into a matrix of 18 model plants. Each model plant includes typical applications and surrogate turbine make/models for future economic analysis. The model plant documentation, including rationale, is being developed for final review at the February 26, 1998 CTWG meeting.

The Subcategorization Task Group was merged with the Model Plant Task Group during the December 16 teleconference since the goals of each are beginning to overlap.

(VIII) Planning Task Group- The task group revised the WG's Milestone Tracking Summary, which lists the status and schedule for the identified milestones. The task group also revised the MACT Development Time Line, which indicates the current task groups' schedules and the ICCR document schedules. The CTWG MACT Development Timeline and the Milestone Tracking Summary are attached as Attachments A and B, respectively. The task group plans to revise these documents in the future as necessary.

2 Attachments

Attachment A

COMBUSTION TURBINES MACT DEVELOPMENT TIME LINE

Scheduled Item:	Scheduled Date: (Current WG Schedule)	ICCR Document (Original Schedule)
Information Collection		
o Inventory Database		
+ Final Inventory DB	9/30/97	9/97
o Emissions DB		
+ Initial Existing DB	9/30/97	9/97
+ Final Existing DB for uncontrolled sources	3/30/98	9/97
+ Testing Completed & Final Emissions DB for controlled sources	9/98	9/97
MACT Floor (MF) Determination		
o Preliminary MF for existing sources	12/97	9/97
o MF for new sources	9/98	9/97
Dev. of Regulatory Alternatives		
o For existing sources	9/98	2/98
o For new sources	9/98	2/98
Analysis of Alternatives		
o For existing & new sources	11/98	9/98
Selection of Regulatory Alternatives	12/98	9/98
Proposal Signature by Administrator	10/99	10/99

Revision #1
2/10/98

Attachment B

Milestone Tracking Summary

Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Information Collection Inventory Database QA/QC Review of ICCR Emissions Database Emission Testing Recommendations	1/97-9/97	<p> Start Date: 3/97 Completion Date: 9/98 Percent Completed: 55% </p> <ul style="list-style-type: none"> - The Database Enhancement Task Group completed QA/QC efforts of the Inventory Database in August '97. - The Testing Methods, monitoring, and Testing Task Group completed QA/QA efforts of the Emissions Database (of gathered reports) in August '97. Currently gathering additional test reports from state files and WG members which is expected to be completed by March '98. - Testing to determine HAP control efficiency of control devices to be completed in September '98. The final emissions database for controlled sources is scheduled for completion in September '98 after testing has been completed. - Final list of HAPs to be measured was submitted in November '97. Currently in the process of developing a test plan. Drafted a preliminary estimate of testing needs which will be revised subsequent to finalizing the test plan. Testing recommendations will be completed in March '98.
MACT Floor Determination MACT Floor for Existing Sources MACT Floor for new sources	9/97-11/97	<p> Start Date: 9/97 Completion Date: 9/98 Percent Completed: 45% </p> <ul style="list-style-type: none"> - Preliminary MACT Floor for existing sources (using the current emissions database) was completed in December '97. MACT Floor for existing sources to be completed in March '98. - MACT Floor for new sources is scheduled for completion in September '98, subsequent to gathering additional source tests and any WG testing efforts.

Attachment B

Milestone Tracking Summary (Continued)

Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Identification of Regulatory Alternatives Control Technology Assessment Identification of Beyond the Floor Alternatives	11/97-2/98	Start Date: 3/97 Completion Date: 9/98 Percent Completed: 25% - The HAP Reduction Technology Task Group submitted a draft memorandum of Good Operating Practices in May '97. - A Technology Work Shop was held on July 25, 1997, to identify potential HAP control technologies. - An intermediate report listing HAP reduction and prevention technologies is scheduled for submittal in June '98. - Final regulatory alternatives will be submitted in September '98.
Regulatory Analysis Source Subcategorization Model Plant Development Cost Analysis Economic Analysis Emission Reduction Assessment	3/98-8/98	Start Date: 12/97 Completion Date: 11/98 Percent Completed: 25% - The Subcategorization Task Group drafted a memorandum of potential subcategories in July '97. Subcategories may be developed based on model plants analyses. - Initiated efforts in developing model plants. Identified a Model Plants Task Group during the WG's September meeting. Model plant information will be finalized and provided to the Economic Analysis Work Group by March '98. - The WG has not assigned a task group to review Cost Analyses. The WG initiated efforts in conducting literature searches of existing cost data for applicable controls. - Cost analysis for existing and new sources will be completed in May '98. - Economic Analysis and Emission Reduction Assessment is scheduled for completion by November '98.

Attachment B

Milestone Tracking Summary (Continued)

Milestone ¹	ICCR Document Milestone Schedule	Status with Schedule for Completion ²
Preliminary Regulatory Recommendations	9/98	<p>Start Date: Not Started Completion Date: 12/98 Percent Completed: 0%</p> <p>- The HAPs vs. Criteria Task Group is in the process of identifying options for regulatory development. To date, no documentation has been drafted for regulatory options. The task group reviewed information on HAPs vs. Criteria emissions as a function of turbine operating parameters. The test plan includes testing to get more information on this issue.</p> <p>- Selection of Regulatory Alternatives will be completed by December '98.</p>

1 Major milestones are shown in bold type. Some recommended submilestones are also listed.

2 Indicates the current status of the milestone (i.e., whether it has begun, is in data gathering stage, etc.), the expected date to complete the milestone, and, if appropriate, the group or subgroup responsible for completing the milestone.

Revision #1
2/10/98

Attachment 7

Testing and Monitoring Protocol Work Group Status Report

TMPWG STATUS REPORT
February , 1998

ISSUES WITH ICCR DIRECTION WANTED:

None

STATUS OF PRODUCTS UNDER DEVELOPMENT

Compliance method recommendations. Subgroup formed, action plan being developed. (New item)

Monitoring recommendations. Subgroup formed, action plan being developed. (New item)

TMPWG List of potentially significant HAP

We delivered, to the individual SWGs, consensus draft lists and explanations of how we arrived at those lists. Status is summarized in the table below. When available, the file name is provided in the table. NA means that a suggested list is not available from TMPWG. It is the SWG responsibility to decide what to do with those lists.

	Turbines	IC Engines	Boilers	Inciner- ators	Process Heaters
Natural Gas	turbnat.pdf	ricenat.pdf	boilrgas.pdf	NA	phtrgas.pdf
Refinery Gas	NA	NA	boilrgas.pdf	NA	phtrgas.pdf
Diesel	NA	ricedesl.pdf	NA	NA	NA
Oil	NA	NA	boilroil.pdf	NA	NA
Digester Gas	turbdgas.pdf	ricedgas.pdf	boilrdgas.pdf	NA	NA
Landfill Gas	NA	NA	NA	NA	NA
Coal	NA	NA	boilrcoa.pdf	NA	NA
Wood	NA	NA	being developed	NA	being developed

At the same time, we delivered a list of the test methods that were identified in the literature reviewed as being used to generate this list. We anticipate that we will work with the SWGs to identify appropriate test methods for future data gathering.

Test cost model

We have posted (and asked for SWG comments on format and content) a revised test cost model intended to promote SWG use of consistent test cost assumptions during the initial budget planning and test plan development for data gap filling. *We will review comments received to date at our Feb 27 meeting and plan appropriate action.* See file: COSTMOD, in TMPWG miscellaneous files area.

Report on TMPWG assessment of the significance of different test methods on the reported formaldehyde emissions

Project complete. See file: FORMALD1, in TMPWG miscellaneous files area.

Guidance on additional data quality issues

How to interpret existing data that is reported as “below detection limits.”

Guidance Complete. See file: TMDETECT, in TMPWG miscellaneous files area.

QA\QC and Generic guidelines for Quantitative assessment of ICCR Emissions Database

Guidance Complete. See file: TMDBASGD, in TMPWG miscellaneous files area.

Guidance to IC SWG re status of real time test methods

Guidance Complete. See file: TMREAL , in TMPWG miscellaneous files area.

Product of incomplete combustion (PIC) guidance document.

Guidance Complete. See file: TMPICGD, in TMPWG miscellaneous files area.

Attachment 8

Economic Analysis Work Group Status Report

**ECONOMIC ANALYSIS WORK GROUP
STATUS REPORT
February 12, 1998**

Accomplishments Since the Last Status Report

- The Economic Analysis Work Group has met with all five Source Work Groups to discuss the time schedule for deliverables requested to support the economic and benefits analysis.
- The Economic Analysis Work Group has conducted follow-up meetings with model plant subgroups from the Turbines and Incinerator Work Groups.

Tasks and Activities the Work Group is Currently Focusing On

- The Economic Analysis Work Group has requested time at the February Coordinating Committee meetings to present an update on our interactions with the Source Work Groups and to recommend common methods for data development and linkages to the ICCR population database.
- The Economic Analysis Work Group is currently meeting to develop our economic and benefits analysis approach. Prior to beginning the analysis, we will present an overview of our methodology to the Coordinating Committee.
- We are continuing to review the ICCR population database to determine the number of missing values or invalid responses for key variables that will be needed to link cost and emissions impacts associated with model sources to combustion sources in the database.

Plans or Objectives of the Work Group Over the Next 2 Months

- Continue to meet with the Source Work Groups to provide guidance on the development of cost and emissions data for model sources.
- Develop preliminary methodology for economic and benefits analysis.
- Continue to review information contained in the population database and the ICCR database.

Meeting Dates and Locations Over the Next 2 Months

- The Economic Analysis Work Group will meet at the Coordinating Committee meetings in Winston-Salem, February 23, 1998, from 6:00-7:00 PM. The meeting will be held at the conference hotel.

Attachment 9

ICCR Boiler Work Group Status Report

**ICCR BOILER WORK GROUP
STATUS REPORT**

Prepared by:
Dr. James P. Stumbar
stakeholder cochair

February 13, 1998

ICCR BOILER WORK GROUP STATUS REPORT

Introduction

The boiler work group (BWG) consists of three subgroups: fossil fuel, wood, and nonfossil fuel. This is a breakdown following the type of material burned within the boiler. The fossil fuel subgroup handles boilers firing natural gas and gases derived from fossil fuels such as liquid petroleum gas and refinery gas, distillate and residual fuel oils and coals. The wood subgroup handles boilers firing clean wood and treated wood. The nonfossil fuel group handles boilers that burn anything else such as digester gas, landfill gas, bagasse, biomass, scrap tires, processed engineered fuels, etc. The different types of material burned creates a complex situation for the BWG. The BWG has some equipment that will be regulated under Section 112 and some equipment that will be regulated under Section 129. The BWG is the largest group within the ICCR process and contains the most varied representation by stakeholder interests. Due to this complexity progress has been uneven. Some of the groups have proceeded further than others. In general, the BWG lags behind the other work groups due to many factors. Several factors contribute to this slower progress and most of us in the ICCR process share the responsibility for this slow progress. The USEPA has contributed by not providing timely information. Work group members have been hesitant to move forward when information was lacking. Different stakeholder concerns and interests sometimes holds up progress over issues which seem minor. Perceived “micromanaging” by the Coordinating Committee has sometimes contributed to the hesitancy of the group members to move forward.

Accomplishments & Progress

Although the process has been slow, the boiler work group has made significant progress in many areas. Following coordination committee recommendations, the BWG has instituted procedures to come to more rapid closure on important issues. To insure progress, work group members are asked to take responsibility to gather required information and present the information to the entire work group and the affected subgroup. Target deadlines are now set to cutoff debate and move forward passing unresolved issues to the coordinating committee for timely resolution.

Major accomplishments are as follows:

The boiler work group was responsible for convincing the coordinating committee of the need for a good waste definition and contributing people to work on the ad hoc group formed by the coordinating committee. This definition is now being finalized by the USEPA. The WG has given its comments on errors and gaps in the ICCR inventory database. The BWG is presently addressing the issues of HAPs of concern, testing requirements, MACT floor, boiler subcategories, Model boilers, applicability of Section 112 and Section 129, good combustion practices and pollution prevention as follows:

HAPs of concern/testing requirements--

The BWG reached closure on lists of HAPs of concern and recommendations for HAPs for testing have been developed for “natural gas”, distillate fuel oil, residual fuel oil, clean wood and coal. Majority and minority reports and recommendations are being presented for discussion during the present February session of the coordinating committee. HAPs lists for “waste wood” and nonfossil

fuels including digester gas, landfill gas, bagasse, etc. are still being developed. These lists will be discussed during the BWG meeting of February 26, 1998.

Boiler testing requirements will also be discussed during this meeting.

MACT floor--

The BWG has started into discussions to determine the preliminary MACT floor. The EPA has presented a list of control devices identified in the database for various boilers. Work group members were asked to rate the effectiveness of various control devices.

Boiler Subcategories--

Each subgroup has made attempts to subcategorize boilers applicable to their groups. Prior to the January meeting, the fossil fuel subgroup had identified sixteen (16) subcategories related to fuel and boiler types; the wood subgroup had identified fifty seven (57) subcategories and the nonfossil fuel subgroup had identified two hundred and three (203) potential subcategories. The total number of subcategories was obviously intractable. During the January meeting, each subgroup reexamined these subcategories, the fossil fuel group retained sixteen (16) subcategories, the wood subgroup reduced their subcategories to about thirty four (34) and the nonfossil subgroup reduced their subcategories to about twenty five (25). The large number of subcategories is due to the great differences in equipment types combined with significant differences in the fuel characteristics. The BWG will continue to reduce subcategories as further information is processed or becomes available.

Several issues arose during the discussion of subcategories as follows:

- There is a need to address the issue of cofiring wastes and fuels. Many stakeholders favor the concept of a de minimus.
- There is an urgent need for resolution of the "waste definition" since waste fuels will be subject to Section 129 requirement.
- Into which subcategory does one place a boiler which cofires two or more fuels. Guidance must be developed.
- What size boiler should be designated as a reasonable cutoff for those regulated under Section 112?

Model Boilers--

The nonfossil subgroup has made considerable progress in identifying model boilers due to input from member stakeholders concerning their boiler equipment. Sixty seven model boilers have been listed for the first cut.

The issue of cofiring becomes obvious. Some boilers cofire up to four different fuels with no fuel exceeding 35% of the total heat input.

Applicability of Section 112 or Section 129--

Categorization into boilers regulated under Section 129 is needed quickly. The BWG needs prompt action on the definition of a "waste" and the issue of a de minimus for cofiring is very important for establishing proper subcategories.

Coordination with Incinerator Work Group--

The BWG is coordinating Section 129 issues with the incinerator work group and will be prepared to work with them in meeting the schedules.

Pollution Prevention--

The BWG has representatives on the coordinating committee's ad hoc pollution prevention group.

Good Combustion Practices--

The BWG has started to interact with the Process Heaters Work Group to define good combustion practices. The process heater approach and their preliminary guidance were discussed during the January meeting. Two work group members volunteered to actively participate in the process heater committee that is developing the good combustion practice recommendations.

An issue arising from application of good combustion practice is the possible designation of good combustion practices as the MACT floor for gas and distillate oil fired boilers.

Economics--

Members of the economics work group made a presentation to the boiler work group to present the needs for cost information to establish final MACT determinations and the economical degree of control below the MACT floor.

February Meeting--

- Debrief and discuss the CC meeting, especially any guidance provided by the CC to the WG.
- Further refine MACT floors and subcategories based on analysis performed by EPA.
- Develop better understanding of information needed by the Economics Work Group.
- Be informed on the Incinerator Workgroup's progress in developing regulatory alternatives for ICWI/OSWI and discuss coordination between the Incinerator and Boiler Work Groups.
- Begin discussion of data gaps and testing needs.
- Come to closure on HAPs lists for nonfossil fuels.

Attachment 10

Majority Report from Boiler Work Group on HAPs of Concern

**[Electronic Copy in Adobe.PDF and is available on
the TTN and hard copy is available in the Docket]**

**Majority Report On
HAZARDOUS AIR POLLUTANTS (HAPs)
OF CONCERN**

**BOILER WORKGROUP
OF THE
INDUSTRIAL COMBUSTION COORDINATED RULEMAKING
(ICCR)
FEDERAL ADVISORY COMMITTEE**

February 6, 1998

Contact: Wendell Brough – Celanese

Executive Summary

This is the Majority Consensus Report for Hazardous Air Pollutants (HAPs) of concern for the Boiler Workgroup of the Industrial Combustion Coordinated Rulemaking Federal Advisory Committee. It represents the majority opinion of the Boiler Workgroup as determined in a meeting held in Atlanta, Georgia on January 13 and 14, 1998.

The Boiler committee determined that the list of HAPs of Concern really be divided into two lists:

- A. HAPs needing additional testing for which data is inadequate, and
- B. HAPs that would probably need further review for possible regulation and control purposes

A general protocol was developed to decide the final list of HAPs of concern in each boiler fuel group (natural gas, oils, coal, and clean wood). The protocol included:

- A. Reviewing different reference sources for HAPs of concern to develop an initial list for each fuel category
- B. Reviewing known data to determine the emission rates for these different types of fuels,
- C. Determining the magnitude of emissions vented from boilers of 10 million BTU/hr (MMBTU/HR.), 100 MM BTU/HR., and 250 MM BTU/HR. firing rates.
- D. Comparing these emissions with de minimis limits derived from a very conservative stack model provided by the New Hampshire Dept. of Environmental Services (Air Resources Division).
- E. Determining the effectiveness of controlling the emissions at the New Hampshire proposed de minimis emission levels.

A committee of five people representing the fossil fuels and wood fuels reviewed many reference sources of HAPs of concern. These references included EPA Utility HAPs studies, API Studies, the Testing and Monitoring Protocol Work Group suggested lists, New Hampshire list of

HAPs of Concern, EPA's draft of Priority HAPs, a list of Health Risks in Chicago, etc, and several primers given at the ICCR meeting sites.

Once HAPs initial lists were developed for each fuel type, the emission data, when available, was determined for each HAP. These known emission values for each HAP were then converted to emissions for 10, 100 and 250 million (MM) BTU/HR. boilers.

Then there was a comparison of emission rates at the above boiler firing levels with the conservative New Hampshire DES Air Resources Division's proposed de minimis limits. This model data became available after the January 13, BWG meeting. Therefore, it is important to emphasize that this Majority Report lists only the chemicals agreed to at the January meeting. Since that meeting, the HAPs subgroups have been reviewing the data in comparison of the emission model from New Hampshire. This conservative model takes the HAPs review process one step further to finalization.

This comparison of recommended emission rates from the New Hampshire with actual emissions from a 250 MM BTU/hr. boiler indicate that several HAPs are below the recommended New Hampshire de minimis thresholds as can be seen in the tables below. With this new criteria, it will be recommended to the BWG that additional chemicals be dropped from the HAPs of Concern listss.

However, at this time we the Boiler Work Group is presenting the list of constituents that was the majority of the BWG agreed to. Two columns were developed for each fuel type: HAPs needing additional testing and HAPs of concern for possible regulation or control. That list for each fuel type is listed in subsequent pages. A final column is shown with a comparison of actual emissions to the NHDES proposed de minimis limits.

Two types of fuel for which the HAPs List of Concern have not been determined is "Waste Wood" and Non-fossil fuels. Criteria pollutants have only been looked at in the "Clean

Wood” group only. Criteria Pollutants will be reviewed and that list will be generated by the April meeting of the ICCR.

Note for all Tables below:

NHDES Comparison-Actual emissions from 250 MMBTU/Hr. boiler greater or less than New Hampshire DES Proposed Deminimis Limits.

ND – No data available form NHDES or data sources.

(NEW) – Indicates that this is a proposal since the Jan. 13 meeting based on new data.

NATURAL GAS FIRED BOILER LIST

Category	Chemical	More Testing?	HAP of Concern	NHDES Comparison
Volatiles	Benzene	NO	X	ND
	Toluene	NO	X	LESS
	Hexane	YES ?	X(NEW)	ND
Semi Volatiles	POMs	NO	NO(NEW)	ND
Carbonyls	Formaldehyde	NO	X	GREATER
Metals	Arsenic	NO	X	GREATER
	Nickel	NO	X	LESS

DISTILLATE OIL FIRED BOILERS LIST

Category	Chemical	More Testing?	HAP of Concern	NHDES Comparison
Volatiles	Benzene	NO	X	ND
	Xylenes	NO	X	ND
	Toluene	NO	X	ND
	1,3 Butadiene	NO	NO (NEW)	ND
	Phenol	NO	X (NEW)	ND
Semi Volatiles	Dioxins/Furans	NO	X	ND
	POMs/ Naphthalene	NO	X	ND
Acid Gases	Hydrochloric acid	NO	X	ND
	Hydrogen fluoride	NO	X	ND
Aldehydes/ ketones	Formaldehyde	NO	X	LESS
	Acetaldehyde	NO	X	ND
Metals	Arsenic	NO	X	GREATER
	Beryllium	NO	X	GREATER
	Cadmium	NO	X	GREATER
	Chromium	NO	X	GREATER
	Lead	NO	X	GREATER
	Manganese	NO	X	GREATER
	Mercury	NO	X	GREATER
	Nickel	NO	X	LESS

RESIDUAL OIL FIRED BOILER LIST

Category	Chemical	More Testing?	HAP of Concern	NHDES Comparison
Volatiles	Benzene	NO	x	ND
	Xylenes	NO	x	LESS
	Toluene	NO	x	LESS
	1,3 Butadiene	NO	NO (NEW)	ND
	Phenol	NO	x	LESS
	Methylene chloride	NO	NO (NEW)	LESS
Semi Volatiles	Dioxins/Furans	NO	x	ND
	POMs/ naphthalene	NO	x	ND
Acid Gases	Hydrochloric acid	NO	x	ND
	Hydrogen fluoride	NO	x	ND
Carbonyls	Formaldehyde	NO	x	GREATER
	Acetaldehyde	NO	x	LESS
Metals	Arsenic	NO	x	GREATER
	Beryllium	NO	x	GREATER
	Cadmium	NO	x	GREATER
	Chromium	NO	x	GREATER
	Cobalt	NO	x	GREATER
	Lead	NO	x	GREATER
	Manganese	NO	x	GREATER
	Mercury	NO	x	GREATER
	Nickel	NO	x	GREATER
	Phosphorus	NO	X	GREATER
	Selenium	NO	x	ND

COAL FIRED BOILER LIST

Category	Chemical	More Testing?	HAP of Concern	NHDES Comparison
Volatiles	Benzene	NO	x	ND
	Xylenes	NO	X	LESS
	Methylene Chloride	NO	X	LESS
Semi Volatiles	POM	YES	X	ND
	Dioxin	YES	X	ND
	Isophorone	NO	X	ND
	Phenol	NO	X	LESS
Acid Gases	Hydrochloric Acid	NO	X	ND
	Hydrogen Fluoride	NO	X	ND
Carbonyls	Acetaldehyde	NO	X	LESS
	Acrolein	NO	X	LESS
Metals	Arsenic	NO	X	GREATER
	Beryllium	NO	X	GREATER
	Cadmium	NO	X	GREATER
	Chromium	NO	X	GREATER
	Cobalt	NO	X	GREATER
	Lead	NO	X	GREATER
	Manganese	NO	X	GREATER
	Mercury	NO	X	GREATER
	Nickel	NO	X	GREATER
	Selenium	NO	X	ND
	Phosphorus	NO	X	GREATER
	Cyanide Compounds	NO	X	ND

What about Isophorone, Methylene Chloride (Dichloromethane)

CLEAN WOOD FIRED BOILER LIST

Category	Chemical	More Testing?	HAP of Concern
Volatiles	Benzene	YES	x
	Toluene	YES	X
	Xylenes	YES	X
Semi Volatiles	PAH	YES	X
CARBONYLS	Formaldehyde	YES	X
	Acrolein	YES	X
		YES	X
Criteria Pollutants	NOx	YES	X
	Particulates	YES	X
	Carbon Monoxide	YES	X
	NMHC	YES	X

I. Introduction

The Boiler Work Group (BWG) contains 3 key subgroups:

- A. Fossil Fired Boiler Subgroup
Wood Fired Boiler Subgroup
- B. Non-Fossil Fired Boiler Subgroup

Each subgroup was given the task of developing a list of Hazardous Air Pollutants (HAPs) of concern, starting with the Clean Air Act List of 189 HAPs. After an initial effort, an Ad Hoc group consisting of representatives from each subgroup was formed to examine the HAPs and provide recommendations to the BWG through its individual subgroups. Since HAPs emissions are related to fuel characteristics, the Ad Hoc group developed separate lists for individual fuels. Only fuels regulated under Section 112 of the CAA were considered. The Ad Hoc group was able to make recommendations for fossil fuels and clean wood. Lists for “waste wood” and nonfossil fuels such as digester gas, landfill gas, bagasse, etc. are still being developed.

HAPs of concern was defined as a list of HAPs that might be emitted from firing the above types of boilers for which:

- C. There was enough data on a constituent showing that it should be considered during rule-making, or
- D. There was insufficient information to make the determination.

The Fossil Fired Boiler Subgroup subcategorized their fuels into natural gas, oil (distillate and residual) and coal. The Wood Fired Boiler Subgroup categorized their fuels into Clean Wood and Waste Wood.

Major contributors to this majority report are:

NAME	REPRESENTING	FUEL
Wendell Brough	Celanese	Natural Gas
Mark Bryson	Alcoa	Coal
Frank Ferraro	Wheelabrator Technologies, Inc.	Clean Wood
Alex Johnson	Citizens Commission for Clean Air In the Lake Michigan Basin	Coal
Gunseli Shareef	Radian	Oil

II. Fossil Fired Boiler Subgroup

A. Methodology of Determination

The Fossil Fired Boiler Subgroup established more descriptive definitions for several fossil fuels. Natural gas was defined as treated pipeline quality gas, not wellhead gas. This would include liquified petroleum gas (LPG) and propane. It also includes refinery gas based on the information from the ICCR PERF Primer and the pre-publication report “Air Toxic Emission Factors for Combustion Sources Using Petroleum-Based Fuels”, Volume 1 – “Development of Emission Factors Using API/WSPA Approach”¹. Distillate fuel oil includes No. 2 fuel oil or lighter, whereas residual fuel oil includes oils heavier than No. 2 fuel oil.

The definition of coal is standard. It includes anthracite, semi-anthracite bituminous, sub bituminous and lignite coals.

For each type of fuel category for Fossil Fired Boilers (natural gas, distillate oil, residual oil, and coal) several resources were reviewed for HAPs of concern. These initial HAP resources are listed in the attachments as follows:

Natural Gas - Table 1 and Table 2 under notes at bottom of spreadsheet.

Distillate Oil - Table 3 and Table 4 under notes at bottom of spreadsheet and Table 7.

Residual Oil - Table 5 and Table 6 under notes at bottom of spreadsheet and Table 7.

Coal - Table 8.

Clean Wood - Table 10.

When a HAP was found on multiple resource lists then it was further investigated as a HAP of initial concern. HAPs not appearing on the various resource lists of concerns were not further investigated.

To further investigate HAPs of initial concern various databases were tapped for emission data. Data from these databases are indicated in the attachments as follows:

Fuel Type	Data	Data References
Natural Gas	Table 2	Table 2 under notes at bottom of spreadsheet
Distillate Oil	Table 4	Table 4 under notes at bottom of spreadsheet and Table 7
Residual Oil	Table 6	Table 6 under notes at bottom of spreadsheet and Table 7
Coal	Table 9	Table 9 under notes at bottom of spreadsheet

Comparisons were then run using the worst emissions or median values from multiple tests (coal) from the various data sources. They were calculated for total emissions US-wide and calculated for a 10 million BTU/hour (MMBTU/hr.) boiler, a 100 MMBTU/hr. boiler and a 250 MMBTU/hr. boiler. These boiler sizes were picked because they represent sizes of typical industrial boilers. These emission rates are shown in Tables 2,4,6 and 9.

Based on these emission rates the final list of HAPs of concern was developed. Where there were data gaps or conflicting data, the majority stakeholders propose that additional tests be run or additional resources be sought to resolve the conflicting data or to fill these gaps.

A list of HAPs that may need to be regulated or further reviewed was then developed. This list was agreed to by the majority of the BWG who attended the January 13 meeting in

Atlanta. This List of HAPs of Concern is an Interim Final list. It will still undergo scrutiny to see if any additional chemicals can be eliminated from the list due to yet-to-be-found data or information that shows that the emissions are not of a concern. Many of these HAPs of Concern for the fossil fired boilers were compared with the list of HAPs needing further Analysis from Section 5 of the Utility HAPs Study ². They matched well with that list. An important part of this study was this Section 5 EPA proposal list of HAPs of further Analysis. It showed the HAPs that the EPA would consider further in Utility Boiler studies. This list was a key comparison for the list proposed before the BWG on January 13.

After the meeting on January 13, the Fossil Fuels Team reviewed proposed de minimis emission limits from a New Hampshire emissions model. Mr. Andrew Bodnarik of the BWG is employed by the New Hampshire Department of Environmental Services (NHDES), Air Resources Division. He shared the New Hampshire model which is being developed to predict de minimis emission rates for various chemicals. These de minimis limits were compared to the various database emission values for the three boiler scenarios (10, 100 and 250 MMBTU/hr.) for HAPs of concern accepted by the majority stakeholders. Again, these boiler sizes were selected because they are representative of ranges in the EPA boiler database.

Although in many instances the emission rates for these three boiler scenarios is lower than the proposed NHDES de minimis rate, the chemical was left on the list because this was the majority consensus decision of the BWG as of January 13. A list of additional HAPs (with the exception of dioxin/furans) suggested by the minority position were also examined using this procedure. Almost all additional organic HAPs are emitted at lower than the de minimis rate.

B. Proposed New Hampshire Dept. of De minimis Emission Model

The final comparison was with the proposed NHDES De minimis Emission Model. We thank Mr. Bodnarik of the NHDES for sharing the draft model and emission limits because the Ad Hoc group believed that this conservative model comparison step was a necessary part of the

HAPs determination process. From the Model a list of draft de minimis limits was determined⁴ by the NHDES. It was believed then, that any emissions that were lower than the NHDES proposed de minimis limits could automatically be dropped from the list of concerns.

This proposed model used the following assumptions for a “typical facility with downwash problems³”:

- A. Emission rate = 1 lb/hr.
- B. Stack Height = 10 ft.
- C. Stack diameter = 1 ft.
- D. Volume flow = 100 ACFM
- E. Temperature = 68 degrees F
- F. Building height = 10 ft., width = 20 ft. and length = 20 ft.

This equates to a stack velocity of about 1 to 2 ft./sec. Economic stack velocities usually start at about 10 ft/sec. and can go as high as 100 ft/sec. Typical stack gas velocities are usually more than 20 ft/sec. The temperature in the stack is only 68 degrees F. Most exiting stack temperatures from boiler systems are at least 200 – 300 degrees F, even with efficient economizers. A temperature of 68 degrees will cause zero buoyancy of the exiting gas. This type of model would probably not allow drafting in a boiler.

Basically this model guarantees maximum downstream downwash of any constituents and will predict much higher concentrations of emitted species at the point of impact than would be found under more realistic conditions.

Table 11 has a listing of the proposed NHDES de minimis limits.

Based on this evaluation two things can be said about this model:

- G. It is so conservative that any chemical emission rates near to or below the model's de minimis level should seriously be considered for elimination from the HAPs list of concerns in the future.
- H. It is so conservative that any emission rates above the model de minimis should not be automatically accepted as a HAP of concern. There are many metals that are higher than the proposed model level that are still only in the pounds per year range. With emission levels this low, it has to be questioned as to whether there is a serious impact on ambient background levels. Also, it would be questioned as to the efficacy of costly control measures for pound per year emissions.

C. Natural Gas Fired Boilers

The initial HAPs list of concern, derived from several resource lists of concern, contained twenty (20) chemicals (Table 1). As shown in Table 2, there were several data references and tests have been run on almost all the initial HAPs of Concern. Therefore, none of the chemicals need to be retested. Also, data sources are from a diverse range of boilers; large utility boiler data, industrial sized API boilers and industrial MACT floor boilers were used.

After reviewing the emission rates, only six chemicals remained on the list of concern (See *Executive Summary Tables*). Hexane showed up on the list and may have to be retested because there were only two data points discovered. Dioxins/Furans were not included in the final list due to data presented in the ICCR Dioxin Primer and due to the EPA indicating no concern in its Utility Boiler HAPs study². Formation of Dioxins/Furans is highly unlikely since these fuels do not contain chlorinated compounds.

HAPs that will seriously be considered for elimination as HAPs of concern will be Toluene and Nickel since the calculated values in boilers up to 250 MM BTU/hr. are less than the proposed New Hampshire DES de minimis levels. Polycyclic Organic Matter (POM) will be requested to be eliminated as a HAP of concern because tests indicate that boilers emit less than 1 pound per year. Although all the metals emissions from boilers up to 250 MM BTU/hr. are shown to be greater than the NHDES de minimis levels, they each are all less than 15 pounds per year emission. However, Arsenic and Nickel were recommended for further consideration in the Section 5 EPA Utility Boiler HAPs Study².

It should be noted that these same BWG HAPs of Concern listed in the *Executive Summary* for Gas Fired Boilers compared favorably with EPA's list of HAPs for further analysis for Utility Boilers. This is the list found in Section 5 of the Utility HAPs Report².

D. Oil Fired Boilers

Like the gas fired boilers, many resources were tapped to determine an initial list of HAPs of concern (Table 3 and Table 5 under notes at bottom of spreadsheet and Table 7). This review was performed for both distillate and residual oil. Again, if the HAP did not appear on the lists of HAPs of the various list resources, it was not considered further.

The Initial HAPs of Concerns List for both types of oil are shown in Tables 3 and 5.

Also like the gas fired boilers, several references were reviewed to determine if actual emission data was available for the initial list of HAPs of concern. These emission data references are shown in the bottom of spreadsheets in Tables 4 and 6.

In several instances there was not a lot of data for distillate oil. In most cases combustion experts agree that distillate oil burns as cleanly as natural gas and therefore the natural gas data can be used to predict the emission performance of distillate oil fired units. For that reason, the majority stakeholders propose that no additional testing be performed for distillate oil.

After the initial list of priority HAPs for both types of oil was developed, the list was narrowed down based on the following criteria:

- Magnitude of emissions based on available (conservative) data for a 250 MM BTU/hr boiler (greater than 0.01 tons/yr or 20 pounds/year for the short list)
- Priority HAP based on screening risk assessment from the EPA Utility Boiler HAPs Study, Section 5.
- Availability of emissions data (for testing needs)

The final list of distillate oil HAPs of concern (TABLE 4), decided on by consensus on January 13, contained 19 constituents. These will be further studied in light of the New Hampshire model, compared to natural gas and distillate oil demonstrated emissions for boilers up to 250 MM BTU/hr., to see if the list can be shortened.

Although greater than the NHDES de minimis limits, the actual individual metal emissions for 250 MM BTU/hr. boilers are all less than about 40 pounds/year. Total chromium is the only exception and is about 150 pounds per year. These metals should be considered for elimination from the list of HAPs of concern.

For most compounds actual emission data for residual oil existed. Therefore, majority stakeholders recommend that no further sampling or analysis is necessary for residual oil.

The final list of residual oil HAPs of concern (TABLE 6) was decided on by consensus on January 13, contained 24 HAPs of concern. This list agrees with the list proposed by the EPA for HAPs considered priority for further analysis (Table 5-10 of the EPA HAPs Utility Boiler Study²). In fact, this proposed list for Residual Oils (Table in the *Executive Summary*) has a few more constituents than Table 5-10 has.

However, it is proposed that this interim final list be reconsidered before the MACT rule making. Comparing the emissions from boilers up to 250 MM BTU/hr with the NHDES de minimis list, Xylenes, Toluene, Phenol, Methylene Chloride, Naphthalene, and Acetaldehyde were all less than the NHDES proposed de minimis limits.

Additionally, several of the metals (Arsenic, Beryllium, total Chromium, Cobalt and Mercury) were calculated to be less than 60 pounds/year emissions each. Ranging between 250 to 350 pounds per year each were Cadmium, Lead and Selenium. Only Manganese (1600 lbs/y) and Nickel (3700 lbs/yr) were above those values.

D. Coal Fired Boilers

Like gas and oil fired boilers, many resources for coal fired HAPs of concern were tapped to determine an initial list of HAPs of concern. There were about 18 resources that were reviewed for their HAPs of concern. These HAPs were determined for all coal fuel types (bituminous, sub bituminous, anthracite, semi anthracite and lignite). The spreadsheet indicating the compilation of the various resource concern lists is not shown in this document because of its length. However, the resources for the list are shown in TABLE 8.

One of the key sources for the initial HAPs list of concerns was the EPA “Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Interim Final Report” (Utility Report)². The testing done to support the report attempted to identify all 188 HAPs. Over 70 HAPs were detected.

This same EPA Utility Boiler HAPs Report was used for the emission data. Another list was generated that indicated when a HAP of initial concern was over 2.5 lbs/trillion BTU and detected more than once for a parameter. These lists are shown in the columns marked “Concern List” and “>2.5 lbs/trillion” in Table 9. Dioxins, POMs and all metals are also included in this column since these were agreed to by the BWG as HAPs of concern.

After a review of the first cut list , a second cut list was developed. The additional information on the second cut list is from two lists; one developed as a concern list by the Testing and Monitoring Protocol Work Group (TMPWG) [so labeled on Table 9] and the other is a list from Section 5 of the Utility Report Table 5-10 (Pollutants considered for further Analysis).

Review of the second cut list led to the final list of HAPS of concern for coal. The following guidelines were used to develop the final list:

A. If all four factors agreed then the parameter made the final list. The four factors were:

1. >2.5 lbs/trillion BTU in more than one test.
 2. Compiled from the studies/processes lists.
 3. On the TMPWG list.
 4. On the EPA list from Section 5 of the Utility Report.
- A. If three of the four factors and the emission rate was over 5 lbs/trillion BTU.
- B. All metals since some met the above categories.
- C. BTEX, POMs, and Dioxins since the sububgroup agreed that these parameters were of concern.
- D. Isophorone did not fit any of the above except that the emissions factor was high. It was included in the final list.

Emissions data was available from the HAPs Utility Report. It had many data points so there is no need to resample any of this coal boiler data.

There are 22 HAPs of concern for Coal shown in the final list in TABLE 9 and in the *Executive Summary* table. The list shown here is the list that was the majority consensus decision from the BWG meeting of January 13.

Emissions for 250 MMBTU/hr, 100 MM BTU/hr. and 10 MM BTU/hr boilers were estimated based on the median data from the EPA Utility Report. They were then compared with the New Hampshire deminimis limits. Several of these emission rates (Xylenes, Methylene Chloride, Phenol, Acetaldehyde and Acrolein) are below the proposed New Hampshire deminimis levels so they may be dropped in the future. . The metal emission rates, although greater than the conservative NHDES deminimis limits, are less than 60 pounds/yr. each and most are about 30 pounds/yr or less. So these likewise should be considered for elimination from the list of HAPs of Concern.

III. Wood Fired Boilers

A. Method of Determination

Woods include “clean wood” and “waste wood”. The discussions in this document will look only at “clean wood”. This is essentially untreated or virgin wood.

The Wood Subgroup was tasked with developing a list of HAPS of concern from the Section 112 list of 188 HAPS. The purpose of the list is to identify HAPS of concern, and where the lack of data might require testing to further evaluate the possibility or need to develop emissions standards for the identified HAPS. The list is not necessarily a list of HAPS for which regulations will ultimately be developed.

Whereas the Fossil Fuel Subgroup had several reference documents such as the EPA Utility HAPS Study, the RICE Report, etc. from which to draw information, the Wood Subgroup had no similar reference documents.

However, EPA provided the Boiler Working Group with a “Preliminary List of Pollutants of Priority” (Attachment 1) which is a list of pollutants of potential concern based upon a number of criteria, e.g., Urban Air Source list, Great Waters list, Highly toxic list, Testing and Monitoring Protocol Work Group list, etc. The studies from which these lists were drawn had previously identified the pollutants on the EPA Preliminary List as ones which may contribute to environmental or human health concerns.

The Wood Subgroup reviewed EPA's list with the assistance of an outside contractor who provided recommendations for pollutants that might be found in the flue gases from wood combustion. The contractor's recommendations are based upon those pollutants that either had been found or theoretically might be found in significant and measurable quantities in wood combustion flue gas, and whether any of the listed pollutants or others might be used as

surrogates for any of the pollutants on EPA's list thereby minimizing the need for costly emissions testing.

Two lists of recommendations were initially developed based upon the wood material being combusted. A list of wood materials tentatively called “clean wood”, and a list for “waste wood.” However, due to confusion over the purpose of the List of HAPS of Concern, and the definition of “waste wood”, the Wood Subgroup has decided to submit only the “clean” wood list (List of HAPS of Concern for Wood Combustion, TABLE 10) at this time. At the next Wood Subgroup meeting (February 1998), the issues concerning the “waste wood” list will be resolved.

B. HAPs List of Concerns – Clean Wood

The Final HAPs List of Concerns for Clean Wood are shown in TABLE 10.

Organic Compounds

Burning wood under poor combustion conditions has the potential to result in emissions of organic HAPs due to the partial but incomplete combustion of the wood. Since the majority of the 188 enumerated HAPs in Section 112 are organics, establishing individual emission limits for each of the organic HAP compounds potentially emitted from these combustion sources would be impractical. Measuring each compound would be very costly and would pose an unreasonable compliance and monitoring burden on the regulated community while achieving little, if any, emission reduction from the proposed approach. The list, therefore, contains several organic HAPS which could possibly be present in quantities sufficient to warrant further investigation.

Some ICCR members have raised concern that Dioxins and Furans are not included on the Wood HAPS List, as wood combustion was listed as a potential source of dioxins/furans in the ICCR Dioxin Primer. Available data from a large wood-fired boiler indicate that emissions of total dioxins/furans are approximately 0.3 ng/m³ (corrected to 7% O₂), and 0.003 ng/m³ (corrected to 7% O₂) on a Toxic Equivalents basis. These values are orders of magnitude below standards

for other emissions sources in the U.S. and Europe. Therefore, listing dioxins and furans, at this time, on the wood list was deemed inappropriate.

Metals

For “clean” wood, no metals are included in the proposed list since the concentration of metals in wood is extremely low.

Criteria Pollutants

While Criteria Pollutants are not included as part of the Section 112 HAPS list, the Wood Subgroup added criteria pollutants to the list of potential pollutants for testing purposes. For existing wood-fired boilers, should additional HAPS pollutant testing be required to build the database to develop the MACT standards, testing for particulate matter and carbon monoxide would be useful as these two pollutants may be potential surrogates for some HAPS emissions. In addition, New Sources combusting wood will be subject to standards for all Criteria Pollutants.

IV. Recommendations

Based on the information contained in this report and its attachment, the following recommendations are being presented to the Coordinating Committee of the ICCR:

1. It is recommended that the HAPs of Concern listed in the "Executive Summary" and which were accepted by a majority of the Boiler Workgroup likewise be accepted by the reviewing body of this report.
2. It is further recommended that, based on additional conservative modeling information, the HAPs of Concern listed in the "Executive Summary" be further reviewed by the BWG to determine if any additional chemicals can be dropped from the list.

V. Summary

Many reference sources have been looked at for each type of boiler fuel in this study (natural gas, distillate and residual oil, coal and clean wood). These sources yielded initial HAPs of concern. Emission data, where available from various data resources, was then applied to each initial HAP of Concern. A Final List of HAPs of Concern was then developed for each fuel category.

Both the Fossil Fuel subgroup and the Wood subgroup of the BWG submitted their proposal to the BWG on January 13. A majority consensus for the final list of HAPs of concern was agreed to at that meeting. The tables in the *Executive Summary* of this report reflect that list of HAPs of Concern for each fuel group.

Although this Intermediate List of HAPs of concern is being submitted to the ICCR Coordinating Committee in the February meeting, there is still work to be performed to see if the list needs to be modified. As seen in this document, a comparison was made between the proposed de minimis limits from a conservative emission model (New Hampshire DES Model) and actual boiler emission data. Many of the actual emissions are either very low or are below the NHDES model de minimis limits. Therefore the Ad Hoc group will recommend to the BWG, before the April ICCR Coordinating Committee meeting, that additional HAPs be dropped from the list of concerns.

REFERENCES

1. Hansel, David and England, Glenn, “AIR TOXIC EMISSION FACTORS FOR COMBUSTION SOURCES USING PETROLEUM-BASED FUELS Volume 1 - Development of Emission Factors Using API/WSPA Approach; prepared by Energy and Environmental Research Corporation, Irvine CA.; For Western States Petroleum Association, Concord CA.; and American Petroleum Institute, Washington, D.C. October 17, 1997. (Prepublication Copy)
2. *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Interim Final Report.* EPA-453/r-96-013a, October, 1996.
3. *Proposed Air Toxics De Minimis Procedure.* October 10, 1997 memo from Mr. Jim Black, Modeling Supervisor to Mr. Tim Donnelly, State of New Jersey, Department of Environmental Services, Air Resources Division.
4. “Revised 1/19/98 for DRAFT Minority Report Additonal Section 112(b) Hazardous Air Pollutants of Concern for Natural Gas Fired Boilers, Residual oil-fired Boilers, Wood-fired Boilers, and Coal-fired boilers.” Fax submitted to Mr. Jim Stumbar by Mr. Andy Bodnarik, 1/19/98, New Hampshire Department of Environmental Services, Air Resources Division.

List of Tables

Table No.	Table Description
1	NATURAL GAS INITIAL HAPs OF CONCERN LIST
2	NATURAL GAS FINAL HAPs OF CONCERN LIST
3	DISTILLATE OIL INITIAL HAPs OF CONCERN LIST
4	DISTILLATE OIL FINAL HAPs OF CONCERN LIST
5	RESIDUAL OIL INITIAL HAPs OF CONCERN LIST
6	RESIDUAL OIL FINAL HAPs OF CONCERN LIST
7	4. RESOURCES USED TO DETERMINE OIL INITIAL HAPs OF CONCERN LIST.
8	RESOURCES USED TO DEVELOP COAL INITIAL LIST HAPs OF CONCERN LIST
9	COAL FINAL HAPs OF CONCERNS LIST
10	WOOD INITIAL AND FINAL HAPs/CRITERIA POLLUTANTS OF CONCERN LISTS
11	New Hampshire DES-ARD DRAFT Deminimis Emission Limits

Attachment 11

Minority Report From Boiler Work Group on HAPs of Concern

[Note that the docket copy contains hard copies of additional materials that were presented but were not available electronically for the meeting]

**ICCR Boiler Workgroup
Minority Recommendation Report
Federal, State, Medical & Environmental Caucus Report
on Additional Section 112(b) and Section 129
Hazardous Air Pollutants of Concern
for Industrial Boilers**

Submitted to the ICCR Coordinating Committee

February 22, 1998

by

**Jim Eddinger, U.S. EPA, Combustion Group, OAQPS, RTP, North Carolina
Andrew M. Bodnarik, NHDES-Air Resources, Concord, New Hampshire
David Marrack, M.D., Fort Bend Medical Clinic, Houston, Texas
G. Alex Johnson, Citizens Commission for Clean Air in the Lake Michigan Basin
Robert Palzer, Ph.D, Oregon Chapter of the Sierra Club, Portland, Oregon**

**Boiler Workgroup
Federal, State, Medical & Environmental Caucus Report on
Additional Section 112(b) and Section 129 Hazardous Air Pollutants of Concern
for Industrial Boilers Prepared by Members Representing
Federal, State, Medical, & Environmental Interests**

The partial lists of Section 112(b) and Section 129 Hazardous Air Pollutants (“HAPs”) contained in this report are preliminary lists of HAPs of Concern which were derived from a review of technical literature used in conjunction with selection methods that lead the contributors to this report to believe that these HAPs either have been found in or might reasonably be expected to be found in industrial boiler exhaust gases as a result of the combustion of the various fuels for which they have been listed. The lists of HAPs of concern contained in this report are not necessarily complete, but rather represent a good faith effort to be conservative in the selection of HAPs of concern while at the same time providing the data necessary to protect public health. **These lists do not constitute a request that all of the HAPs listed be tested for, but rather that these HAPs be considered when preliminary testing lists are prepared.** There is significant expectation that these HAPs are present in industrial boiler exhaust gases for the systems reviewed. Both the methods used to select HAPs for testing and the testing protocols ultimately used to perform actual tests should be capable of determining whether or not these HAPs are present, the concentration of these HAPs found in industrial boiler exhaust gases and the boiler operating conditions which cause these HAPs to form.

Several members of the Boiler Workgroup have used different procedures and different criteria to select Section 112(b) and Section 129 HAPs of concern. This has resulted in lists of additional HAPs of concern for industrial boilers firing natural gas, residual oil, wood, and coal beyond those currently listed as HAPs of concern in the Boiler Workgroup majority report (See Attachment #1). In many cases the different procedures and selection criteria used by the contributors to this minority report resulted in the same HAP being listed as an additional HAP of concern for industrial boilers firing the same type of fuel. It is important to note that the procedures and selection criteria used are as important as the resulting lists and that the

procedures described to select HAPs of concern can be used with different sets of selection criteria. For example, EPA dispersion modeling techniques with site specific parameters (e.g. location, stack height, stack temperature, stack volumetric flow rate, and stack emission rates) can be used to determine whether or not the level of emissions of a particular HAP from a single industrial boiler is significant enough to be listed as a HAP of concern. EPA interactive dispersion modeling techniques can then be used to estimate the overlapping impacts of multiple industrial boilers which emit the same HAP in order to refine the “significance level” analysis. Brief descriptions of the different procedures and selection criteria used by the contributors to this report follow with more detailed descriptions of these procedures and the technical literature reviewed as part of these procedures included as Attachments #2 and #3 to this report.

As previously discussed lists of HAPs of concern are included in this report for boilers firing natural gas, residual oil, wood, and coal. **When using these terms the contributors to this report are referring to the definitions found in Subpart Db (Industrial Boilers NSPS, 40 CFR 60.40b) and in Subpart Eb (Municipal Waste Combustors NSPS, 40 CFR 60.50b).** In Subpart Db (Industrial Boilers NSPS, 40 CFR 60.40b) the following definitions are given:

1. Coal means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by the American Society of Testing and Materials in ASTM D388-77, Standard Specification for Classification of Coals by Rank (IBR-see section 60.17), coal refuse, and petroleum coke. Coal-derived synthetic fuels, including but not limited to solvent refined coal, gasified coal, coal-oil mixtures, are also included in this definition. (Note: The contributors to this report assume that the term “coal-oil mixtures” refers to mixtures of coal and oil where the terms coal and oil are as defined in 40 CFR 60.40b).
2. Natural gas means (1) a naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth’s surface, of which the principal constituent is methane; or (2) liquid petroleum gas, as defined by the American Society of Testing and Materials in ASTM D1835-82, Standard Specification for Liquid Petroleum Gases (IBR- see section 60.17). **(Note: This definition conflicts with the definition found in the Boiler Workgroup’s majority report, where refinery gas is treated as natural gas for the purpose of selecting HAPs of concern. Further the contributors to this report consider natural gas to be process natural gas and not field gas).**

3. Oil means crude oil or petroleum or liquid fuel derived from crude oil or petroleum. Including distillate and residual oil. (Note: The term residual oil is defined in 5. below).
4. Distillate oil means fuel oils that contain 0.05 weight percent nitrogen or less and comply with the specifications for fuel oil numbers 1 and 2, as defined by the American Society of Testing and Materials in ASTM D396-78, Standard Specification for Fuel Oils.
5. Residual oil means crude oil, fuel oils numbers 1 and 2 that have a nitrogen content greater than 0.05 weight percent, and all fuel oil numbers 4, 5, and 6, as defined by the American Society of Testing and Materials in ASTM D-396-78, Standard Specification for Fuel Oils.

In Subpart Eb (Municipal Waste Combustors NSPS, 40 CFR 60.50b) the following definitions are given:

1. Clean wood does not include yard waste, which is defined elsewhere in 40 CFR 60.50, or construction, renovation, and demolition wastes (including but not limited to railroad ties and telephone poles), which are exempt from the definition of municipal solid waste in this section. (Note: Clean wood also does not include wood contaminated with adhesives, binders, glues, or resins such as the materials used in the production of chip board and wafer board or pressed wood products).
2. Untreated lumber means wood or wood products that have been cut or shaped and include wet, air-dried, and kiln-dried wood products. Untreated lumber does not include wood products that have been painted, pigment-stained, or pressure-treated. Pressure-treating compounds include, but are not limited to chromate, copper arsenate, pentachlorophenol, and creosote.

In order to comply with the requirements of Section 129 of the Clean Air Act, standards promulgated are to specify numerical emission limitations for the following pollutants: particulate matter (total and fine), opacity, sulfur dioxide, hydrogen chloride, oxides of nitrogen, carbon monoxide, lead, cadmium, mercury, and dioxins and dibenzofurans (See Section 129(a)(4).

Therefore, at a minimum, these listed section 129 HAPs (hydrogen chloride, lead, cadmium, mercury, dioxins and dibenzofurans) should be on every list of HAPs of concern or any priority HAPs list for any subcategory of fuel materials that may be considered to be

a “nonhazardous solid waste” and therefore subject to the provisions of Section 129 of the Clean Air Act. Whether or not testing is subsequently conducted for each HAP listed should depend on the emissions data and the other available information reviewed by the Boiler Workgroup. These Section 129 HAPs should be included on the list of HAPs of concern for the wood waste category and for any other category in the non-fossil fuel type that may potentially be considered a waste material mixture. In addition based on the Dioxin Primer, dioxin should also be on the list of HAPs of concern for clean wood since wood-fired units were indicated to have a potential for dioxin formation. Again, whether clean wood-fired, industrial boilers would be tested for dioxin should be determined based on the emissions data and the other available information reviewed by the Boiler Workgroup.

Contributors to this report would like to note that over the past three decades, environmental organizations, public health authorities, U.S. and Canadian agencies, and the regulated community have contributed substantially to an increasing body of research by conducting modeling analyses and using other techniques developed to better quantify and understand the environmental and public health threats posed by HAPs in the Great Lakes Basin and in other areas of this country. This increasing body of knowledge about the deleterious impact of HAPs on the Great Lakes Basin, a critical ecosystem, has fostered the development of many state-of-the-art emissions inventories , academic collaborations, monitoring networks, deposition models, regulatory and voluntary emission reduction initiatives and recommendations from the International Joint commission which must be considered in the ICCR process. It is especially important that this large body of knowledge be used when creating lists of HAPs of concern not only for industrial boilers but for all types of industrial combustion sources.

In addition to considering the requirements of Section 129 of the Clean Air Act , other requirements of the Clean Air Act contained in Sections 110, 112(c)6, 112(k), 112(m) and 112(n) must also be factored in to the decision-making process when identifying lists of HAPs of concern. Several reports from the U.S. EPA were incorporated into the database constructed by the Citizen’s Commission for Clean Air In the Lake Michigan Basin (“CCA-LMB”)(see Attachment #2 and the reference list included). The information contained in these reports was

used to identify HAPs of concern from all ICCR combustion sources including industrial boilers. Based upon this preliminary analysis, CCA-LMB offers the following recommendations:

1. Mapping, level of concern analyses, and/or other analysis tools must be used before any HAP can be eliminated from consideration as either a HAP of concern or a HAP for testing.
2. All types of fuels and fuel-mixtures must be “bench marked” for the Section 112(c)6 and Section 129 pollutants as well as other persistent, bioaccumulative HAPs (PBTs).
3. Emission factors for any fuel potentially contaminated by DDE, toxaphene, lindane, aldrin/dieldrin and Aroclor must be established.
4. Testing of criteria pollutants and their precursors must be an integral component of any ICCR program.
5. A similarity rigorous analysis should be performed for all subcategories (boilers, process heaters, turbines, etc.) on each type of fuel by the designated ICCR workgroup.
6. The process used to perform the rigorous analysis should recognize the financial and time constraints imposed on the ICCR process, however good science should prevail and support should be given to EPA for seeking the additional funding necessary to perform a quality analysis on the HAPs identified as HAPs of concern.

During the process of developing this report several concerns have repeatedly arisen including:

1. The energy consumption data used in the majority report is markedly lower than the recent energy consumption data contained in the DOE/EIA State Energy Data Report for 1995 (see Attachment #4). Therefore the estimated total tons per year of HAPs emitted by industrial boilers as reported in the majority report is significantly lower than estimates of total tons per year of HAPs calculated using the DOE/EIA 1995 data.
2. The emission factors contained in the literature can vary by several orders of magnitude. This variation in emission factors seems to be especially large for organic HAPs like benzene. Complete background data including full stack test reports should be thoroughly review by the ICCR Testing & Monitoring Protocols

Workgroup before an emission factor is accepted as accurate and subsequently used to select HAPs of concern or HAPs for testing.

3. The variation in HAP emission factors is dependent not only on the type of combustor or type of fuel being burned in the combustor and the type of air pollution control being used in conjunction with the combustor, but also on the operating conditions of the combustor (See the natural gas-fired process heater report). Also to be considered is the effect of start-ups, shutdowns, upsets and load swings on the concentration of HAPs. Other geographical factors may warrant the development of a range of emission factors for some fuel types (i.e. pesticides in biomass and metals in coal vary with geography). Therefore current emission factors should be used with caution and new emission factors should be determined for several sets of operating conditions. (Note. Item 6. Above already acknowledged the financial and time constraints under which the ICCR is operating).
4. The amount of test data available for many HAPs is extremely limited and in some cases non-existent. This lack of test data should not be used as an excuse for eliminating a given HAP as a HAP of concern or a HAP for testing.
5. The simultaneous testing of HAPs and criteria pollutants (fine particulate matter, NO_x, VOC, CO, and SO₂) for all fuel types is critical in order to be able to determine the operating conditions which are most likely to lead to the formation of a given HAP. If EPA certified methods for measuring PM-2.5 are not available at the time of testing, then currently available PM-10 methods should be used in order to at least begin the process of identifying the amount of fine particulate matter present.
6. The determination of precursors for fine particulate matter and other organic HAPs is also critical since some HAPs are formed after the stack gases are released into the atmosphere. For example, volatile organic compounds and oxides of nitrogen are precursors for ozone, sulfur dioxide and oxides of nitrogen are precursors for the sulfates and nitrates formed in the ambient air as fine particulate matter and some HAPs are formed in the ambient air from the reactive hydrocarbons contained in boiler stack gases.
7. While this report does address the issue of boilers firing fuel mixtures or boilers co-firing different fuels, it is important to note that the lists of HAPs of concern when firing mixed fuels should include the HAPs generated from the combustion of each of the fuels in the mixture.
8. The combustor itself is not the only source of HAP emissions, fugitive HAP emissions (i.e., radionuclides, volatile organic compounds) generated by activities such as fuel storage, fuel handling and ash disposal must also be addressed.

9. The contributors to this report are also concerned about the combined impact of the HAPs emitted simultaneously by many small industrial boilers located in the same area. Multiple small boilers with short exhaust stacks are in essence area sources and often can have a greater impact in the immediate local area than a single large boiler with a tall exhaust stack. One example of this phenomena is the impact of woodstoves on ambient air quality due both to inefficient combustion and low stack heights.

Based on the information contained in this report and its attachments, in addition to the recommendations previously made by the CCA-LMB, the contributors to this report recommend that the Coordinating Committee of the ICCR either:

1. Add the additional HAPs of concern to those listed by the Boiler Workgroup and forward the revised lists to EPA for consideration or;
2. Refer both the majority report and this report to EPA for consideration.

ATTACHMENT #1

Federal, State, Medical & Environmental Caucus Report

Additional Section 112(b) and Section 129 HAPs of Concern for Industrial Boilers

**Federal, State, Medical & Environmental Caucus List
of Additional Section 112 (b) and Section 129 HAPs of
Concern for Natural Gas-fired boilers
(Revised 2/4/98)**

CAS Number	Pollutant	HAP List for Natural Gas	Boiler Workgroup HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Natural Gas Boilers tons/yr	EPA Utility Boiler Priority for Gas
75070	Acetaldehyde	Yes-PIC	No	0.0145		
108907	Chlorobenzene	Yes-D.M.	No	0.253		
132649	Dibenzofurans	Yes-Baseline	No			
100414	Ethyl Benzene	Yes - TMPWG	No	1.64		
110543	Hexane	Yes-Detected	No	0.328		
7647010	Hydrochloric acid	Yes-D.M.	No	0.0328		
91203	Naphthalene	Yes-PIC	No	0.203		
108952	Phenol	Yes - TMPWG	No	0.074		
7723140	Phosphorous	Yes-Detected	No	0.00039		
1746016	2,3,7,8-tetrachloro, dibenzo-p-dioxin	Yes-Baseline	No			
1330207	Xylenes	Yes-PIC	No	1.695		
95476	o-xylenes	Yes-PIC	No	1.695		
108383	m-xylenes	Yes-PIC	No	1.695		
10642	p-xylenes	Yes-PIC	No	1.695		
0	Cadmium Compounds	Yes-Detected	No	0.000039		
0	Chromium Compounds	Yes-AP-42	No	0.002		
0	Cobalt Compounds	Yes-AP-42	No	0.000078		
0	Lead Compounds	Yes-AP-42	No	0.000196		
0	Manganese Compounds	Yes-AP-42	No	0.000082		
0	Mercury Compounds	Yes-Detected	No	0.000492		
0	POMs	Yes-TMPWG	No			

Yes-PIC = On TMPWG list as product of incomplete combustion.

Yes - TMPWG = recommended by TMPWG.

Yes- AP-42 = Emission factor listed in AP-42 for natural gas-fired industrial boilers.

Yes - Detected = HAP was detected during previous stack testing

Yes- Baseline = Recommended as baseline HAP of Concern for all fuel types by Alex Johnson

Yes- D.M. = Recommended as HAP of Concern by Dr. David Marrack

**Federal, State, Medical & Environmental Caucus List
of Additional Section 112 (b) and Section 129 HAPs of
Concern for Residual Oil-fired boilers (Continued)
(Revised 2/4/98)**

CAS Number	Pollutant	HAP List for Residual Oil	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Residual Oil Boilers tons/yr	EPA Utility Boiler Priority for Residual Oil
75070	Acetaldehyde	Yes-PIC	No	0.01475		
100414	Ethyl benzene	Yes-Detected	No	1.64		
71556	Methyl chloroform (1,1,1-trichloroethane)	Yes-Detected	No	7.45		
75092	Methylene chloride	Yes-Detected	No	0.68		
108054	Vinyl acetate	Yes-Detected	No	0.328		

Note: These lists are based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

Yes-PIC = On TMPWG list as product of incomplete combustion.

Yes-Detected = HAP was detected during previous stack testing.

a:\oilcomp9.wpd

**Minority Recommendation List of
Additional Section 112 (b) and Section 129 HAPs
of Concern for Wood-fired Boilers
(Revised 2/4/98)**

CAS Number	Pollutant	HAPs List for Wood/Biomass	Boiler Work Group HAP List Clean Wood 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Clean Wood Boilers tons/yr
75070	Acetaldehyde	Yes-PIC	No	0.01475	
67663	Chloroform	Yes-Detected	No	0.1915	
132649	Dibenzofurans	Yes-Baseline	No		
91203	Naphthalene	Yes-PIC	No	0.203	
1336363	Polychlorinated biphenyls	?	No	0.000164	
1746016	2,3,7,8-tetrachloro-di-benzo-p-dioxin	Yes-Baseline	No		
0	Antimony Compounds	?	No	0.00196	
0	Arsenic Compounds	Yes-Detected	No	0.000039	
0	Beryllium Compounds	Yes-Detected	No	0.0000078	
0	Cadmium Compounds	Yes-Detected	No	0.000039	
0	Chromium Compounds	Yes-Detected	No	0.00196	
0	Cobalt Compounds	Yes-Detected	No	0.000078	
0	Lead Compounds	Yes-Detected	No	0.000196	
0	Manganese Compounds	Yes-Detected	No	0.000082	
0	Mercury Compounds	Yes-Detected	No	0.000492	
0	Nickel Compounds	Yes-Detected	No	0.0391	
0	Selenium Compounds	Yes-Detected	No	0.00078	

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers)

Yes-PIC = On the TMPWG list as a product of incomplete combustion.

Yes - Detected = HAP was detected during previous stack testing.

Yes - Baseline = Recommended as a baseline HAP of concern for all fuel types by Alex Johnson

? = Need to check final TMPWG recommended list for wood.

**Federal, State, Medical & Environmental Caucus List
of Additional Section 112 (b) and Section 129 HAPs
of Concern for Coal-fired boilers
(Revised 2/4/98)**

CAS Number	Pollutant	HAPs List for Coal	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr	EPA Utility Boiler Priority for Coal
98862	Acetophenone	Yes-Detected	No			
79061	Acrylamide	Yes-A.J.	No			
107131	Acrylonitrile	Yes-A.J.	No			
75252	Bromoform	Yes-Detected	No	0.0203	2.9	
106990	1,3 - Butadiene	Yes-A.J.	No	0.0172		
92524	Biphenyl	Yes-Detected	No	0.00715	0.1	
117817	Bis(2-ethylhexyl)phthalate	Yes-Detected	No		1.8	
75150	Carbon disulfide	Yes-Detected	No			
56235	Carbon tetrachloride	Yes-Detected	No	0.121	1.4	
532274	2-Chloroacetophenone	Yes-Detected	No	0.0000492	0.1	
108907	Chlorobenzene	Yes-Detected	No	0.253	1.4	
67663	Chloroform	Yes-Detected	No	0.1915	1.4	
98828	Cumene	Yes-Detected	No			
84742	Dibutylphthalate	Yes-Detected	No	0.0275	1.2	
131113	Dimethyl phthlate	Yes-A.J.	No			
100414	Ethyl benzene	Yes-Detected	No			
106934	Ethylene dibromide	Yes-Detected	No	0.0082	1.4	
107062	Ethylene dichloride	Yes-Detected	No	0.156	1.4	
50000	Formaldehyde	Yes-PIC	No	0.00145	1.8	
118741	Hexachlorobenzene	Yes-Detected	No			
110543	Hexane	Yes-Detected	No			
67561	Methanol	Yes-A.J.	No			
74839	Methyl Bromide	Yes-Detected	No	0.0082	0.4	
74873	Methyl Chloride	Yes-Detected	No	0.4025	2.5	
78933	Methyl ethyl ketone	Yes-Detected	No	1.64	3.5	
74884	Methyl iodide	Yes-Detected	No	0.066	0.2	
108101	Methyl isobutyl ketone	Yes-Detected	No	0.8	2.1	
80626	Methyl methacrylate	Yes-Detected	No			
91203	Napthalene	Yes-Detected	No			
62759	N-Nitrosodimethylamine	Yes-Detected	No	0.00000115	0.6	Yes

**Federal, State, Medical & Environmental Caucus List
of Additional Section 112 (b) and Section 129 HAPs
of Concern for Coal-fired boilers (Continued)
(Revised 2/4/98)**

CAS Number	Pollutant	HAPs List for Coal	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr	EPA Utility Boiler Priority for Coal
108952	Phenol	Yes-Detected	No	0.074	2.7	
85449	Phthalic anhydride	Yes-Detected	No	0.0239	2.1	
1336363	Polychlorinated biphenyls	Yes-A.J.	No			
123386	Propionaldehyde	Yes-Detected	No		4.4	
78875	Propylene dichloride	Yes-A.J.	No			
100425	Styrene	Yes-Detected	No			
79345	1,1,2,2-Tetrachloroethane	Yes-Detected	No			
127184	Tetrachloroethylene	Yes-Detected	No	0.665	1.4	
108883	Toluene	Yes-PIC	No	0.655	1.8	
79005	1,1,2-trichloroethane	Yes-Detected	No	0.03025	2.1	
79016	Trichloroethylene	Yes-Detected	No			
108054	Vinyl acetate	Yes-Detected	No			
75014	Vinyl chloride	Yes-A.J.	No			
75354	Vinylidene chloride	Yes-Detected	No	0.11	4.2	
0	Antimony Compounds	Yes-Detected	No	0.00196	0.6	
0	Radionuclides	Yes-Detected	No			Yes

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

Yes-PIC = On the TMPwglist as a product of incomplete combustion.

Yes-Detected = HAP was detected during previous stack testing.

Yes- A.J. = Recommended as HAP of Concern by Alex Johnson.

ATTACHMENT #2

Federal, State, Medical & Environmental Caucus Report Additional Section 112(b) and Section 129 HAPs of Concern Matrix for Coal-fired Industrial Boilers

Prepared by

**G. Alex Johnson, Director
Citizens Commission for Clean Air in the Lake Michigan Basin**

ATTACHMENT #3

Federal, State, Medical & Environmental Caucus Report

Criteria & Procedure for Selecting ICCR Boiler HAPs of Concern

Prepared by

**Andrew M. Bodnarik
State of New Hampshire
Department of Environmental Services
Air Resources Division**

Appendix-1

List of Section 112 (b) Hazardous Air Pollutants of Concern for Natural gas-fired boilers (Revised 2/4/98)

CAS Number	Pollutant	Natural Gas	NHDES-ARD Deminimus tons/yr	ICCR Gas Sources tons/yr
75070	Acetaldehyde	Yes-PIC	0.01475	
71432	Benzene	Yes-PIC	0.00625	
100414	Ethyl Benzene	Yes-TMPWG	1.64	
50000	Formaldehyde	Yes-PIC	0.00145	
110543	Hexane	Yes-Detected	0.328	
91203	Naphthalene	Yes-PIC	0.203	
108952	Phenol	Yes- TMPWG	0.074	
7723140	Phosphorous	Yes-Detected	0.0003905	
108883	Toluene	Yes-PIC	0.655	
1330207	Xylenes	Yes-PIC	1.695	
95476	o-xylenes	Yes-PIC	1.695	
108383	m-xylenes	Yes-PIC	1.695	
106423	p-xylenes	Yes-PIC	1.695	
	PAHs	Yes-PIC		
	Fluorene	Yes-PIC		
	Fluoranthene	Yes-PIC		
	2-methyl naphthalene	Yes-PIC		
	Phenanthrene	Yes-PIC		
	Pyrene	Yes-PIC		
0	Arsenic Compounds	Yes-*	0.0000395	
0	Cadmium Compounds	Yes-Detected	0.00003905	
0	Chromium Compounds	Yes-AP-42	0.00196	
0	Cobalt Compounds	Yes-AP-42	0.000078	
0	Lead Compounds	Yes-AP-42	0.000196	
0	Manganese Compounds	Yes-AP-42	0.000082	
0	Mercury Compounds	Yes-Detected	0.000492	
0	Nickel Compounds	Yes-*	0.0391	

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers)

Yes-PIC = On TMPWG list as a product of incomplete combustion

Yes -TMPWG = recommended by TMPWG.

Yes-Detected = HAP was detected during previous stack testing.

Yes-AP-42 = Emission factor listed in AP-42 for natural gas-fired industrial boilers.

Yes-*= Should test fuel for these metals instead of stack testing.

Appendix - 2
List of Section 112 (b) Hazardous Air Pollutants of Concern for
Residual Oil-fired boilers
(Revised 2/4/98)

CAS Number	Pollutant	Residual Oil	NHDES-ARD Deminimus tons/yr	ICCR Residual Oil Boilers tons/yr
75070	Acetaldehyde	Yes-PIC	0.01475	
71432	Benzene	Yes-PIC	0.00625	
132649	Dibenzofurans	?		
100414	Ethyl benzene	?	1.64	
50000	Formaldehyde	Yes-PIC	0.00145	
7647010	Hydrochloric acid (hydrogen chloride)	?	0.0328	
7664393	Hydrogen fluoride (Hydrofluoric acid)	?	0.009	
71556	Methyl chloroform (1,1,1-trichloroethane)	?	7.45	
75092	Methylene chloride	?	0.68	
91203	Naphthalene	Yes-PIC	0.203	
108952	Phenol	?	0.074	
7723140	Phosphorus	?	0.0003905	
1746016	2,3,7,8-tetrachloro-dibenzo-p-dioxin	?		
108883	Toluene	Yes-PIC	0.655	
108054	Vinyl acetate	?	0.328	
1330207	Xylenes	Yes-PIC	1.695	
95476	o-xylenes	Yes-PIC	1.695	
108383	m-xylenes	Yes-PIC	1.695	
10642	p-xylenes	Yes-PIC	1.695	
	PAHs	Yes-PIC		
	Fluorene	Yes-PIC		
	Fluoranthene	Yes-PIC		
	Chrysene	Yes-PIC		
	2-methylnaphthalene	Yes-PIC		
	Phenanthrene	Yes-PIC		
	Pyrene	Yes-PIC		
0	Arsenic Compounds	Yes-*	0.000039	
0	Beryllium Compounds	Yes-*	0.0000078	
0	Cadmium Compounds	Yes-*	0.000039	
0	Chromium Compounds	Yes-*	0.00196	

Appendix - 2
List of Section 112 (b) Hazardous Air Pollutants of Concern for
Residual Oil-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	Residual Oil	NHDES- ARD Deminimus tons/yr	ICCR Residual Oil Boilers tons/yr
0	Cobalt Compounds	Yes-*	0.000078	
0	Lead Compounds	Yes-*	0.000196	
0	Manganese Compounds	Yes-*	0.000082	
0	Mercury Compounds	Yes-*	0.000492	
0	Nickel Compounds	Yes-*	0.0391	
0	Selenium Compounds	Yes-*	0.00078	

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

?= Need to check TMPWG recommended test list and ask if HAP is likely PIC for residual oil

Yes-*= Should test fuel for these metals instead of stack testing.

Appendix - 3
List of Section 112 (b) Hazardous Air Pollutants of Concern
for Wood-fired Boilers
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Wood/ Biomass	NHDES-ARD Deminimus tons/yr	ICCR Clean Wood Boilers tons/yr
75070	Acetaldehyde	Yes-PIC	0.01475	
107028	Acrolein	?	0.328	
71432	Benzene	Yes-PIC	0.00625	
67663	Chloroform	Yes-Detected	0.1915	
132649	Dibenzofurans	?		
50000	Formaldehyde	Yes-PIC	0.00145	
91203	Naphthalene	Yes-PIC	0.203	
1336363	Polychlorinated biphenyls	?	0.000164	
1746016	2,3,7,8-tetrachlorodi-benzo-p-dioxin	Yes-AP-42		
108883	Toluene	Yes-PIC	0.655	
1330207	Xylenes	Yes-PIC	1.695	
95476	o-xylenes	Yes-PIC	1.695	
108383	m-xylenes	Yes-PIC	1.695	
10642	p-xylenes	Yes-PIC	1.695	
	PAHs	Yes-PIC		
0	Antimony Compounds	?	0.00196	
0	Arsenic Compounds	Yes-AP-42	0.000039	
0	Beryllium Compounds	Yes-Detected	0.0000078	
0	Cadmium Compounds	Yes-AP-42	0.000039	
0	Chromium Compounds	Yes-AP-42	0.00196	
0	Cobalt Compounds	Yes-AP-42	0.000078	
0	Lead Compounds	Yes-AP-42	0.000196	
0	Manganese Compounds	Yes-AP-42	0.000082	
0	Mercury Compounds	Yes-AP-42	0.000492	
0	Nickel Compounds	Yes-AP-42	0.0391	
0	Selenium Compounds	Yes-AP-42	0.00078	

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers)

Yes-PIC = On the TMPWG list as a product of incomplete combustion

? = Need to check final TMPWG recommended list for wood.

Yes-Detected= HAP was detected during previous stack testing.

Yes-AP-42 = Emission factor listed in AP-42 for wood-fired industrial boilers.

Appendix - 4
List of Section 112 (b) Hazardous Air Pollutants of Concern for
Coal-fired boilers
(Revised 2/4/98)

CAS Number	Pollutant	Coal	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr
75070	Acetaldehyde	Yes-PIC	0.01475	3.0
107028	Acrolein	Yes	0.0328	1.4
71432	Benzene	Yes-PIC	0.00625	1.1
75252	Bromoform	Yes-Detected	0.0203	2.9
106990	1,3-Butadiene	?	0.0172	
92524	Biphenyl	Yes	0.00715	0.1
117817	Bis(2-ethylhexyl)phthalate (DEHP)	Yes-Detected		1.8
463581	Carbon disulfide	No	1.15	1.9
56235	Carbon tetrachloride	Yes-Detected	0.121	1.4
532274	2-Chloroacetophenone	Yes-Detected	0.0000492	0.1
108907	Chlorobenzene	Yes-Detected	0.253	1.4
67663	Chloroform	Yes-Detected	0.1915	1.4
95487	o-Cresol	No	0.121	0.7
108394	m-Cresol	No	0.121	0.3
106445	p-Cresol	No	0.121	0.4
98828	Cumene	No	1.335	0.1
132649	Dibenzofurans	?		
84742	Dibutylphthalate	Yes-Detected	0.0275	1.2
100414	Ethyl benzene	No	1.64	0.2
75003	Ethyl chloride	No	16.4	1.1
106934	Ethylene dibromide	Yes-Detected	0.0082	1.4
107062	Ethylene dichloride	Yes-Detected	0.156	1.4
50000	Formaldehyde	Yes-PIC	0.00145	1.8
110543	Hexane	No	0.328	0.4
7647010	Hydrochloric acid (hydrogen chloride)	Yes	0.0328	9187.5
7664393	Hydrogen fluoride (Hydrofluoric acid)	Yes	0.009	1837.5
78591	Isophorone	Yes	0.154	10.5
74839	Methyl bromide	Yes-Detected	0.0082	0.4
74873	Methyl chloride	Yes-Detected	0.4025	2.5
71556	Methyl chloroform (1,1,1-trichloroethane)	No	7.45	1.5

Appendix - 4
List of Section 112 (b) Hazardous Air Pollutants of Concern for
Coal-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	Coal	NHDES- ARD Deminimus tons/yr	ICCR Coal Sources tons/yr
78933	Methyl ethyl ketone	Yes-Detected	1.64	3.5
74884	Methyl iodide	Yes-Detected	0.066	0.2
108101	Methyl isobutyl ketone	Yes-Detected	0.8	2.1
624839	Methyl methacrylate	No	1.6	0.5
1634044	Methyl tert butyl ether	No	4.92	0.6
75092	Methylene chloride	Yes	0.68	5.7
91203	Naphthalene	No	0.203	0.3
62759	N-nitrosodimethylamine	Yes-Detected	0.00000115	0.6
108952	Phenol	Yes-Detected	0.074	2.7
7723140	Phosphorous	Yes	0.0003905	13.6
85449	Phthalic anhydride	Yes-Detected	0.0239	2.1
123386	Propionaldehyde	Yes-Detected		4.4
100425	Styrene	No	1.64	1.4
1746016	2,3,7,8-tetrachlorodi-benzo-p-dioxin	?		
127184	Tetrachloroethylene (Perchloroethylene)	Yes-Detected	0.665	1.4
108883	Toluene	Yes-PIC	0.655	1.8
79005	1,1,2-trichloroethane	Yes-Detected	0.03025	2.1
79016	Trichloroethylene	No	1.05	1.4
108054	Vinyl acetate	No	0.328	0.2
75354	Vinylidene chloride	Yes	0.11	4.2
1330207	Xylenes	No	1.695	2.1
95476	o-xylenes	No	1.695	0.4
108383	m-xylenes	No	1.695	0.7
106423	p-xylenes	No	1.695	
	PAHs	Yes-PIC		
	Acenaphthene	Yes-PIC		
	Anthracene	Yes-PIC		
	Fluorene	Yes-PIC		
	Fluoranthene	Yes-PIC		
	Chrysene	Yes-PIC		

Appendix - 4
List of Section 112 (b) Hazardous Air Pollutants of Concern for
Coal-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	Coal	NHDES- ARD Deminimus tons/yr	ICCR Coal Sources tons/yr
	2-methylnaphthalene	Yes-PIC		
	Phenanthrene	Yes-PIC		
	Pyrene	Yes-PIC		
0	Antimony Compounds	Yes-Detected	0.00196	0.6
0	Arsenic Compounds	Yes-*	0.0000395	1.3
0	Beryllium Compounds	Yes-*	0.0000078	0.2
0	Cadmium Compounds	Yes-*	0.00003905	0.3
0	Chromium Compounds	Yes-*	0.00196	3.7
0	Cobalt Compounds	Yes-*	0.000078	1.2
0	Cyanide Compounds	Yes-*	0.0196	12.3
0	Lead Compounds	Yes-*	0.000196	2.1
0	Manganese Compounds	Yes-*	0.000082	6.6
0	Mercury Compounds	Yes-*	0.000492	1.7
0	Nickel Compounds	Yes-*	0.0391	3.6
	Radionuclides	Yes-Detected		
0	Selenium Compounds	Yes-*	0.00078	27.1

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

Yes-PIC = On TMPWG list as a product of incomplete combustion

?= Need to check TMPWG recommended test list and ask if HAP is likely PIC for coal

Yes-Detected = HAP was detected during previous stack testing.

Yes-*= Should test fuel for these metals instead of stack testing.

Appendix-5
Comparison of Draft Section 112 (b) and Section 129 HAPs of Concern
for Natural Gas-fired boilers
(Revised 2/4/98)

CAS Number	Pollutant	AMB's HAP List for Natural Gas	Boiler Workgroup HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Natural Gas Boilers tons/yr	EPA Utility Boiler Priority for Gas
75070	Acetaldehyde	Yes-PIC	No	0.0145		
71432	Benzene	Yes-PIC	Yes	0.00625		
100414	Ethyl Benzene	Yes - TMPWG	No	1.64		
50000	Formaldehyde	Yes-PIC	Yes	0.0145		Yes
110543	Hexane	Yes-Detected	No	0.328		
91203	Naphthalene	Yes-PIC	No	0.203		
108952	Phenol	Yes - TMPWG	No	0.074		
7723140	Phosphorous	Yes-Detected	No	0.00039		
108883	Toluene	Yes-PIC	Yes	0.655		
1330207	Xylenes	Yes-PIC	No	1.695		
95476	o-xylenes	Yes-PIC	No	1.695		
108383	m-xylenes	Yes-PIC	No	1.695		
10642	p-xylenes	Yes-PIC	No	1.695		
	PAHs	Yes-PIC	Yes			
	Fluorene	Yes-PIC	Yes			
	Fluoranthene	Yes-PIC	Yes			
	2-methyl naphthalene	Yes-PIC	Yes			
	Phenanthrene	Yes-PIC	Yes			
	Pyrene	Yes-PIC	Yes			
0	Arsenic Compounds	Yes-*	Yes	0.000039		Yes
0	Cadmium Compounds	Yes-Detected	No	0.000039		
0	Chromium Compounds	Yes-AP-42	No	0.002		
0	Cobalt Compounds	Yes-AP-42	No	0.000078		

Appendix-5
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Natural Gas-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	AMB's HAP List for Natural Gas	Boiler Workgroup HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Natural Gas Boilers tons/yr	EPA Utility Boiler Priority for Gas
0	Lead Compounds	Yes-AP-42	No	0.000196		
0	Manganese Compounds	Yes-AP-42	No	0.000082		
0	Mercury	Yes-Detected	No	0.000492		
0	Nickel	Yes-*	Yes	0.0391		Yes

Yes-PIC = On TMPWG list as a product of incomplete combustion

Yes - TMPWG = recommended by TMPWG.

Yes -Detected = HAP was detected during previous stack testing.

Yes-*= Should test fuel for these metals instead of stack testing.

Yes-AP-42 = Emission factor listed in AP-42 for natural gas-fired industrial boilers.

Appendix - 6
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Residual Oil-fired boilers
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Residual Oil	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Residual Oil Boilers tons/yr	EPA Utiltiy Boiler Priority for Residual Oil
75070	Acetaldehyde	Yes-PIC	No	0.01475		
71432	Benzene	Yes-PIC	Yes	0.00625		
132649	Dibenzofurans	?	Yes			Yes
100414	Ethyl benzene	Yes-Detected	No	1.64		
50000	Formaldehyde	Yes-PIC	Yes	0.00145		
7647010	Hydrochloric acid (Hydrogen chloride)	?	Yes	0.0328		Yes
7664393	Hydrogen fluoride (Hydrofluoric acid)	?	Yes	0.009		Yes
71556	Methyl chloroform (1,1,1-trichloroethane)	Yes-Detected	No	7.45		
75092	Methylene chloride	Yes-Detected	No	0.68		
91203	Naphthalene	Yes-PIC	Yes	0.203		
108952	Phenol	?	Yes	0.074		
7723140	Phosphorus	?	Yes	0.0003905		
1746016	2,3,7,8-tetrachlorodi-benzo-p-dioxin	?	Yes			Yes
108883	Toluene	Yes-PIC	Yes	0.655		
108054	Vinyl acetate	Yes-Detected	No	0.328		
1330207	Xylenes	Yes-PIC	Yes	1.695		
95476	o-xylenes	Yes-PIC	Yes	1.695		
108383	m-xylenes	Yes-PIC	Yes	1.695		
10642	p-xylenes	Yes-PIC	Yes	1.695		
	PAHs	Yes-PIC	Yes			
	Fluorene	Yes-PIC				
	Fluoranthene	Yes-PIC				
	Chrysene	Yes-PIC				
	2-methylnaphthalene	Yes-PIC				
	Phenanthrene	Yes-PIC				
	Pyrene	Yes-PIC				
0	Arsenic Compounds	Yes-*	Yes	0.000039		Yes
0	Beryllium Compounds	Yes-*	Yes	0.0000078		Yes

Appendix - 6
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Residual Oil-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Residual Oil	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Residual Oil Boilers tons/yr	EPA Utiltiy Boiler Priority for Residual Oil
0	Cadmium Compounds	Yes-*	Yes	0.000039		Yes
0	Chromium Compounds	Yes-*	Yes	0.00196		Yes
0	Cobalt Compounds	Yes-*	Yes	0.000078		
0	Lead Compounds	Yes-*	Yes	0.000196		Yes
0	Manganese Compounds	Yes-*	Yes	0.000082		Yes
0	Mercury Compounds	Yes-*	Yes	0.000492		Yes
0	Nickel Compounds	Yes-*	Yes	0.0391		Yes
0	Selenium Compounds	Yes-*	Yes	0.00078		
	POMs		Yes			

Note: These lists are based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

?= Need to check final TMPWG recommended test list and ask if HAP is likely PIC for residual oil.

Yes-*= Should test fuel for these metals instead of stack testing.

Appendix - 7
Comparison of Draft Section 112 (b) and Section 129 HAPs
of Concern for Wood-fired Boilers
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Wood/Biomass	Boiler Work Group HAP List Clean Wood 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Clean Wood Boilers tons/yr
75070	Acetaldehyde	Yes-PIC	No	0.01475	
107028	Acrolein	?	Yes	0.328	
71432	Benzene	Yes-PIC	Yes	0.00625	
67663	Chloroform	Yes-Detected	No	0.1915	
132649	Dibenzofurans	?	No		
50000	Formaldehyde	Yes-PIC	Yes	0.00145	
91203	Naphthalene	Yes-PIC	No	0.203	
1336363	Polychlorinated biphenyls	?	No	0.000164	
1746016	2,3,7,8-tetrachlorodi-benzo-p-dioxin	Yes-AP-42	No		
108883	Toluene	Yes-PIC	Yes	0.655	
1330207	Xylenes	Yes-PIC	Yes	1.695	
95476	o-xylenes	Yes-PIC	Yes	1.695	
108383	m-xylenes	Yes-PIC	Yes	1.695	
10642	p-xylenes	Yes-PIC	Yes	1.695	
	PAHs	Yes-PIC	Yes		
0	Antimony Compounds	?	No	0.00196	
0	Arsenic Compounds	Yes-AP-42	No	0.000039	
0	Beryllium Compounds	Yes-Detected	No	0.0000078	
0	Cadmium Compounds	Yes-AP-42	No	0.000039	
0	Chromium Compounds	Yes-AP-42	No	0.00196	
0	Cobalt Compounds	Yes-AP-42	No	0.000078	
0	Lead Compounds	Yes-AP-42	No	0.000196	
0	Manganese Compounds	Yes-AP-42	No	0.000082	
0	Mercury Compounds	Yes-AP-42	No	0.000492	
0	Nickel Compounds	Yes-AP-42	No	0.0391	
0	Selenium Compounds	Yes-AP-42	No	0.00078	

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers)

Yes-PIC = On Tmpwg list as a product of incomplete combustion

? = Need to check final TMPWG recommended list for wood.

Yes-Detected = HAP was detected during previous stack testing.

Yes-AP-42 = Emission factor listed in AP-42 for wood-fired industrial boilers.

Appendix - 8
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Coal-fired boilers
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Coal Revised 1/14/98	Alex Johnson's 1/12/98	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr	EPA Utility Boiler Priority for Coal
75070	Acetaldehyde	Yes-PIC	Yes	Yes	0.01475	3.0	
98862	Acetophenone	Yes-Detected	Yes	No			
107028	Acrolein	Yes	Yes	Yes	0.328	1.4	Yes
79061	Acrylamide		Yes	No			
107131	Acrylonitrile		Yes	No			
71432	Benzene	Yes-PIC	Yes	Yes	0.00625	1.1	
75252	Bromoform	Yes-Detected		No	0.0203	2.9	
106990	1,3 - Butadiene	?	Yes	No	0.0172		
92524	Biphenyl	Yes	Yes	No	0.00715	0.1	
117817	Bis(2-ethylhexyl)phthalate	Yes-Detected		No		1.8	
75150	Carbon disulfide	No	Yes	No			
56235	Carbon tetrachloride	Yes-Detected	Yes	No	0.121	1.4	
532274	2-Chloroacetophenone	Yes-Detected		No	0.0000492	0.1	
108907	Chlorobenzene	Yes-Detected	Yes	No	0.253	1.4	
67663	Chloroform	Yes-Detected	Yes	No	0.1915	1.4	
98828	Cumene	Yes-Detected	Yes	No			
132649	Dibenzofurans	?	Yes	Yes			
84742	Dibutylphthalate	Yes-Detected	Yes	No	0.0275	1.2	
131113	Dimethyl phthlate		Yes	No			
100414	Ethyl benzene	No	Yes	No			
106934	Ethylene dibromide	Yes-Detected	Yes	No	0.0082	1.4	
107062	Ethylene dichloride	Yes-Detected		No	0.156	1.4	
50000	Formaldehyde	Yes-PIC	Yes	No	0.00145	1.8	
118741	Hexachlorobenzene	Yes-Detected	Yes	No			
110543	Hexane	No	Yes	No			
7647010	Hydrochloric acid (Hydrogen chloride)	Yes	Yes	Yes	0.0328	9187.5	Yes
7664393	Hydrogen fluoride (Hydrofluoric acid)	Yes	Yes	Yes	0.009	1837.5	Yes
78591	Isophorone	Yes	Yes	Yes	0.154	10.5	
67561	Methanol		Yes	No			
74839	Methyl Bromide	Yes-Detected		No	0.0082	0.4	
74873	Methyl Chloride	Yes-Detected	Yes	No	0.4025	2.5	
78933	Methyl ethyl ketone	Yes-Detected	Yes	No	1.64	3.5	
74884	Methyl iodide	Yes-Detected		No	0.066	0.2	

Appendix - 8
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Coal-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Coal Revised 1/14/98	Alex Johnson's 1/12/98	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr	EPA Utility Boiler Priority for Coal
108101	Methyl isobutyl ketone	Yes-Detected	Yes	No	0.8	2.1	
80626	Methyl methacrylate	No	Yes	No			
75092	Methylene chloride	Yes	Yes	Yes	0.68	5.7	
91203	Napthalene	No	Yes	No			
62759	N-Nitrosodimethylamine	Yes-Detected	Yes	No	0.00000115	0.6	Yes
108952	Phenol	Yes-Detected	Yes	No	0.074	2.7	
7723140	Phosphorous	Yes	Yes	Yes	0.0003905	13.6	
85449	Phthalic anhydride	Yes-Detected		No	0.0239	2.1	
1336363	Polychlorinated biphenyls		Yes	No			
123386	Propionaldehyde	Yes-Detected		No		4.4	
78875	Propylene dichloride		Yes	No			
100425	Styrene	No	Yes	No			
1746016	2,3,7,8-tetrachlorodi-benzo-p-dioxin	?	Yes	Yes			Yes
79345	1,1,2,2-Tetrachloroethane	Yes-Detected	Yes	No			
127184	Tetrachloroethylene	Yes-Detected		No	0.665	1.4	
108883	Toluene	Yes-PIC	Yes	No	0.655	1.8	
79005	1,1,2-trichloroethane	Yes-Detected		No	0.03025	2.1	
79016	Trichloroethylene	No	Yes	No			
108054	Vinyl acetate	No	Yes	No			
75014	Vinyl chloride		Yes	No			
75354	Vinylidene chloride	Yes-Detected		No	0.11	4.2	
1330207	Xylenes	No	Yes	Yes	1.695	2.1	
95476	o-xylenes	No	Yes	Yes	1.695	0.4	
108383	m-xylenes	No	Yes	Yes	1.695	0.7	
10642	p-xylenes	No	Yes	Yes	1.695		
	PAHs	Yes-PIC	Yes	Yes			
	Acenaphthene	Yes-PIC		No			
	Anthracene	Yes-PIC		No			
	Fluorene	Yes-PIC		No			
	Fluoranthene	Yes-PIC		No			
	Chrysene	Yes-PIC		No			
	2-methylnaphthalene	Yes-PIC		No			
	Phenanthrene	Yes-PIC		No			
	Pyrene	Yes-PIC		No			

Appendix - 8
Comparison of Draft Section 112 (b) and Section 129
HAPs of Concern for Coal-fired boilers (Continued)
(Revised 2/4/98)

CAS Number	Pollutant	AMB's Coal Revised 1/14/98	Alex Johnson's 1/12/98	Boiler Work Group HAP List 1/14/98	NHDES-ARD Deminimus tons/yr	ICCR Coal Sources tons/yr	EPA Utility Boiler Priority for Coal
0	Antimony Compounds	Yes-Detected	Yes	No	0.00196	0.6	
0	Arsenic Compounds	Yes-*	Yes	Yes	0.000039	1.3	Yes
0	Beryllium Compounds	Yes-*	Yes	Yes	0.0000078	0.2	Yes
0	Cadmium Compounds	Yes-*	Yes	Yes	0.000039	0.3	Yes
0	Chromium Compounds	Yes-*	Yes	Yes	0.00196	3.7	Yes
0	Cobalt Compounds	Yes-*	Yes	Yes	0.000078	1.2	
0	Cyanide Compounds	Yes-*	Yes	Yes	0.0196	12.3	
0	Lead Compounds	Yes-*	Yes	Yes	0.000196	2.1	Yes
0	Manganese Compounds	Yes-*	Yes	Yes	0.000082	6.6	Yes
0	Mercury Compounds	Yes-*	Yes	Yes	0.000492	1.7	Yes
0	Nickel Compounds	Yes-*	Yes	Yes	0.0391	3.6	Yes
0	Radionuclides	Yes-Detected	Yes	No			Yes
0	Selenium Compounds	Yes-*	Yes	Yes	0.00078	27.1	
	POMs		Yes	Yes			

Note: This list is based on review of the ICCR emissions database, the test reports obtained during the Utility HAPs Study, and a NCASI's technical report (which included a compilation of HAPs data from wood-fired boilers).

Yes-PIC = On TMPWG list as a product of incomplete combustion.

Yes-Detected = HAP was detected during previous stack testing.

?= Need to check final TMPWG recommended test list and ask if HAP is likely PIC for coal

Yes-*= Should test fuel for these metals instead of stack testing.

ATTACHMENT #4

Federal, State, Medical & Environmental Caucus Report

**State Energy Data Report 1995
[DOE/EIA-0214(95)]**

published by

**Energy Information Administration
December 1997**

Attachment 12

Pollution Prevention Subgroup Report

[Note that the hard copy in the project docket and the file "p2report.pdf" on the TTN contain 2 figures that are not available in the word perfect version]

**INDUSTRIAL COMBUSTION COORDINATED RULEMAKING
POLLUTION PREVENTION SUBGROUP REPORT
February 18, 1998**

I. Subgroup Recommendations

The Subgroup offers two recommendations to the Coordinating Committee for consideration. First, the Subgroup requests that the Committee extend the Charter for the Pollution Prevention Subgroup until the next Coordinating Committee meeting (April 28-29, 1998). Second, attached are recommendations for how the Source Work Groups might incorporate "good combustion practices" into regulatory recommendations.

II. Subgroup Charter

The Charter of the Pollution Prevention Subgroup is to:

1. Research and assess pollution prevention methods and techniques which could be applicable to sources included within the ICCR; and
2. To develop recommendations for the Coordinating Committee on how Source Work Groups could identify, develop, and incorporate - where reasonable and/or appropriate - pollution prevention into their regulatory recommendations.

The Subgroup was directed to report recommendations at the February Committee meeting.

III. Pollution Prevention and Subgroup Approach

The Subgroup felt a common definition of "pollution prevention" was critical to fulfilling the Subgroup's Charter. Rather than devote resources to developing a definition of pollution prevention, the Subgroup agreed to accept and communicate to the Coordinating Committee the definition of pollution prevention adopted by EPA. This definition is detailed in Attachments I and II. As shown by these attachments, pollution prevention is placed at the pinnacle of a pollution control hierarchy and is EPA's "preferred" approach in developing policies and rules. In a nutshell, pollution prevention is considered "source reduction" as defined in the Pollution Prevention Act. In terms of energy use, pollution prevention should be considered in terms of techniques which increase efficiency in energy use, substitute environmentally benign fuel sources, and/or design changes that reduce the demand for energy.

Although this definition of pollution prevention is narrow in scope, the Subgroup felt that there were many other non-pollution prevention techniques, which "prevent pollution", and which should be researched. To serve as an initial point of reference for identifying pollution prevention techniques, as well as techniques which prevent pollution, the Subgroup concluded that sources (e.g., boilers, incinerators, turbines, etc.) should be considered as "systems" which include inputs,

the combustion device itself (e.g., boiler, heaters, turbine, etc.), and outputs. This "visualization" of sources as systems is illustrated by Figure 1 attached.

Based on this visualization of sources as systems, the Subgroup formed three work teams:

Input Work Team (Fuel/Waste Management) chaired by John Shoaff and including Dave Schanbacher, Jane Williams, and Janet Peargin.

Combustion Device Work Team (Device Operation) subdivided into two sub-work teams:

Good Combustion Practices chaired by John DeRuyter and including Miriam Lev-On, Sam Clowney, Bill O'Sullivan, Fred Porter, and Jane Williams.

Operator Training chaired by John Fanning and including John DeRuyter, Fred Porter, and Tom Tyler. While not a "member" of the Pollution Prevention Subgroup, Steve Gerritson is also included as a participant.

Output Work Team (Energy Management) chaired by Alex Johnson and including Beth Berglund, Kimberly Davis, and John Shoaff. While not a "member" of the Pollution Prevention Subgroup, Chuck Solt is included as a participant.

IV. Extension of Subgroup Charter

After nearly four months of research, conference calls, meetings and discussions, the Pollution Prevention Subgroup recommends that the Coordinating Committee extend the Subgroup's Charter until the April meeting of the Committee. Although recommendations have been developed by the Subgroup regarding some techniques which prevent pollution (see Good Combustion Practices below), the Subgroup has not developed recommendations regarding pollution prevention techniques, nor recommendations regarding other techniques which prevent pollution (e.g., operator training). If the Charter of the Subgroup is extended, the goal of the Subgroup would be to develop and present recommendations to the Committee at the April meeting regarding pollution prevention techniques, as well as recommendations regarding other techniques which prevent pollution (e.g., operator training).

V. Good Combustion Practices

The Subgroup recommends the Coordinating Committee consider, and forward to the Source Work Groups as Committee recommendations, the attached "Good Combustion Practices". These recommendations, which focus on procedures, knowledge, routine and periodic adjustments and checks, and other actions, identify possible ways the Source Work Groups could incorporate requirements for the use of good combustion practices into regulatory recommendations - with the caveat that not all of these recommendations are applicable in all cases, or to all sources. The Subgroup also recommends that, in forwarding these recommendations, the Committee urge their evaluation by the Source Work Groups on a "case-

by-case” and “source-by-source” basis, before drawing conclusions on whether they are appropriate to include in regulatory recommendations.

VI. Output Work Team

While not a recommendation, the Subgroup felt it would be helpful to forward to the Committee a refinement of the visualization of sources as systems, developed by the Output Work Team. This refinement, a concept of energy load analyses, is attached as Figure 2. The Output Work Team feels this figure is useful for identifying energy efficiency and conservation pollution prevention techniques, as well as for identifying incentives and deterrents to utilizing these pollution prevention techniques at ICCR sources.

VI. Subgroup Membership

Active Members:

Fred Porter

Alex Johnson

Kimberly Davis

Tom Tyler

Sam Clowney

John Shoaff

John Fanning

Miriam Lev-On

Robert Morris

Jane Williams

John DeRuyter

Bill O’Sullivan

Beth Berglund

Janet Peargin

David Schanbacher

Non-Member Participants:

Chuck Solt

Steve Gerritson

Inactive Members:

Lachhman Dev

Ed Repa

Coleman Kavanagh

GOOD COMBUSTION PRACTICES

This guidance is intended to be used by the source work groups in their evaluation of alternative concepts regarding good combustion practices. While operator training could also be considered a good combustion practice, it is covered by separate guidance.

Examples of practices listed are intended to indicate the range of existing practices which are dependent on the specific type of equipment utilized and the fuel/waste input to the combustion device. All examples of specific techniques are not considered applicable to all combustion sources. The source work groups should be requested to evaluate techniques, practices, and possible standard approaches appropriate for subcategories or other subsets of sources.

Periodic checks and adjustments of combustion equipment are intended to occur at intervals appropriate for the source, with key combustion checks timed no less frequent than to coincide with overhaul frequencies.

Good Combustion Technique	Examples of Practices	Applicable Source Types	Possible Standard
Operator practices	-Official documented operating procedures, updated as required for equipment or practice change -Procedures include startup, shutdown, malfunction -Operating logs/record keeping	All	-Maintain written site specific operating procedures in accordance with GCPs, including startup, shutdown, malfunction
Maintenance knowledge	-Training on applicable equipment & procedures	All	-Equipment maintained by personnel with training specific to equipment
Maintenance practices	-Official documented maintenance procedures, updated as required for equipment or practice change -Routinely scheduled evaluation, inspection, overhaul as appropriate for equipment involved -Maintenance logs/record keeping	All	-Maintain site specific procedures for best/optimum maintenance practices -Scheduled periodic evaluation, inspection, overhaul as appropriate

Good Combustion Technique	Examples of Practices	Applicable Source Types	Possible Standard
Stoichiometric (fuel/air) ratio	<ul style="list-style-type: none"> -Burner & control adjustment based on visual checks -Burner & control adjustment based on continuous or periodic monitoring (O₂, CO, CO₂) -Fuel/air metering, ratio control -Oxygen trim control -CO control -Safety interlocks 	Open combustion	<ul style="list-style-type: none"> -SR limits appropriate for unit design & fuel -Routine & periodic adjustment -CO limit
Firebox (furnace) residence time, temperature, turbulence	<ul style="list-style-type: none"> -Supplemental stream injection into active flame zone -Residence time by design (incinerators) -Minimum combustion chamber temperature (incinerators) 	<ul style="list-style-type: none"> -Open combustion with supplemental vent streams -Incinerators 	
Proper liquid atomization	<ul style="list-style-type: none"> -Differential pressure between atomizing media & liquid -Flow ratio of atomizing media to liquid flow -Liquid temp or viscosity -Flame appearance -Atomizer condition -Atomizing media quality 	Open combustion with liquid fuel/waste	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks -Maintain procedures to ensure adequate atomization & mixing with combustion air
Fuel/waste quality (analysis); fuel/waste handling	<ul style="list-style-type: none"> -Monitor fuel/waste quality -Fuel quality certification from supplier if needed -Periodic fuel/waste sampling and analysis -Fuel/waste handling practices 	All- where appropriate	<ul style="list-style-type: none"> -Fuel/waste analysis where composition could vary & of significance to HAP emissions (e.g., not pipeline natural gas) -Fuel/waste handling procedures applicable to the fuel/waste
Fuel/waste sizing	<ul style="list-style-type: none"> -Fuel/waste sizing specification & checks -Pulverized coal fineness checks 	Solid fuel/waste firing	<ul style="list-style-type: none"> -Specification appropriate for fuel/waste fired -Periodic checks
Combustion air distribution	<ul style="list-style-type: none"> -Adjustment of air distribution system based on visual observations -Adjustment of air distribution based on continuous or periodic monitoring 	Mainly stoker and solid fuel firing	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks
Fuel/waste dispersion	<ul style="list-style-type: none"> -Adjustment based on visual observations 	Solid fuel/waste firing	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks

Attachment I

Pollution Prevention as Defined Under the Pollution Prevention Act of 1990

Following passage of the Pollution Prevention Act of 1990, the U.S. Environmental Protection Agency (EPA) developed a formal definition of pollution prevention and a strategy for making pollution prevention a central guiding mission. Under Section 6602(b) of the Pollution Prevention Act, Congress established a national policy that:

pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner. (Source: Henry F. Habicht II, Memorandum: EPA Definition of Pollution Prevention. U.S. Environmental Protection Agency, May 28, 1992.)

This hierarchy of preferred options for dealing with environmental pollution officially places prevention at the top of the list.

According to the EPA's official definition, pollution prevention means "source reduction" as defined in the Pollution Prevention Act, but also includes "other practices that reduce or eliminate the creation of pollutants through (1) increased efficiency in the use of raw materials, energy, water, or other resources, or (2) protection of natural resources by conservation." Source reduction is defined under the Act as any practice which:

reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. Source reduction includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control."

Thus, pollution prevention can be thought of as roughly synonymous with source reduction --- reducing the generation of wastes or contaminants at the source, and thereby reducing releases to the environment that could pose hazards to the environment and public health. Like source reduction, pollution prevention as defined by the Pollution Prevention Act does not include out-of-process recycling, waste treatment, or combustion of wastes for energy recovery.

The exclusion of recycling from the official definition of pollution prevention activities has been a source of controversy. Strictly speaking, recycling is not a form of prevention. However, recycling can confer substantial environmental improvements and can aid in conserving valuable

resources. Thus, industry has argued that recycling should be on par with pollution prevention, since it represents progress toward reducing environmental pollution and achieving greater efficiency in resource use. The EPA has held fast to the more strict interpretation of pollution prevention which excludes recycling because even wastes that are effectively recycled have not been prevented (else they would not exist to be recycled!). However, the position of recycling as the second highest option in Congress's and the EPA's pollution prevention/waste management hierarchy attests to its desirability as a goal in cases where wastes cannot be feasibly prevented. Furthermore, in some cases in-process recycling --- in which materials are directly reincorporated back into the same process --- is considered a form of pollution prevention.

Related Concepts and Terminology:

Because P2 is a newly developing field, there is a lot of terminology being used by different groups and individuals, not all of which is yet well defined or consistently used. Some of the terms, such as source reduction, are essentially synonymous with pollution prevention, as discussed above. However, there are many other terms which, although related to pollution prevention, have specific meanings or usages. The following is a brief explanation of some of the more common terms. A note of caution: the definitions provided here may not coincide in all cases with the meaning intended by some authors or sources.

Pollution prevention itself is a term that can have a variety of meanings, depending upon who is using it. Although the EPA's definition is perhaps the most widely known, others have defined pollution prevention to include recycling and reclamation activities (activities which Congress and the EPA specifically exclude). For example, a draft standard being prepared by the American Society for Testing and Materials (ASTM) on the development and implementation of pollution prevention programs defines pollution prevention as "the act of reducing or eliminating the use, release or generation of a pollutant or potential pollutant through source reduction, recycling, reuse, reclamation or modification of existing practices." (Source: ASTM E50.03 Subcommittee on Pollution Prevention, Reuse, Recycling and Environmental Efficiency, Standard E50.03.1: Guide for Development and Implementation of a Pollution Prevention Program. Working Document, January 24, 1994. Standard is available from ASTM Customer Service Department by calling 215/299-5585.)

Waste minimization was one of the first initiatives in the area of pollution prevention, and focused almost exclusively on solid wastes regulated under the Resource Conservation and Recovery Act (RCRA) --- particularly hazardous wastes. (Source: U. S. EPA, Pollution Prevention 1991: Progress on Reducing Industrial Pollutants. Washington, DC: Office of Pollution Prevention, U.S. EPA, October, 1991. (EPA 21p-3003) pp. 6-7.) Thus waste minimization is much narrower than the current definition of pollution prevention, which focuses on reducing the entire spectrum of pollution and waste, including air emissions, releases to surface and groundwaters, and inefficient energy and materials use, in addition to waste (in the traditional sense) which is sent off for land disposal, treatment, or off-site recycling. Waste minimization has been controversial since it has often included treatment methods to reduce the volume or toxicity of existing waste, rather than focusing solely on minimizing the amount of waste being generated at the source. Recent RCRA

reporting requirements now exclude treatment and energy recovery from the definition of waste minimization activities. However, unlike the EPA's definition of pollution prevention, waste minimization does include recycling in addition to source reduction activities. (Source: Henry Freeman et al., "Industrial Pollution Prevention: A Critical Review." *Journal of Air and Waste Management* 42, no. 5 (May 1992) 619-620.)

Waste reduction is a term that falls somewhere between waste minimization and pollution prevention. Waste reduction has a broader focus than waste minimization with its emphasis on RCRA hazardous wastes, but implies a narrower perspective than pollution prevention with its holistic approach to preventing all types of pollution released to all environmental media from products as well as from industrial processes. Use of the term waste reduction is not widespread, perhaps in part due to its ambiguity.

Toxic use reduction is the elimination or avoidance of using toxic substances in products or processes so as to reduce the risks to the health of workers, consumers, and the general public, and to minimize adverse effects on ecosystems and the environment. Toxic use reduction falls under source reduction. Toxic chemical use substitution refers to the substitution of toxic chemicals with less harmful substances in products or processes. It can also include efforts to reduce or eliminate the use of specific chemicals or categories of toxic substances through development of appropriate substitutes or alternative technologies. Source reduction and toxic chemical use substitution together comprise industrial pollution prevention. (U.S. EPA, *Pollution Prevention 1991: Progress on Reducing Industrial Pollutants*. EPA 21p-3003. Washington: Office of Pollution Prevention, U.S. EPA, October, 1991. pp. 6-7.)

Attachment II

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Office of the Administrator
May 28, 1992

MEMORANDUM

SUBJECT: EPA Definition of "Pollution Prevention"

FROM: F. Henry Habicht II /signed/
Deputy Administrator

TO: All EPA Personnel

EPA is seeking to integrate pollution prevention as an ethic throughout its activities, in accordance with the national policy expressed in the Pollution Prevention Act of 1990. Your individual efforts to push development of new opportunities, approaches, and processes to prevent pollution are impressive and exciting.

While the concept of pollution prevention is broadly applicable--a tool to accomplish many environmental tasks--this memo attempts to guide more consistent use of the term in our activities and written materials. Pollution prevention requires a cultural change--one which encourages more anticipation and internalizing of real environmental costs by those who may generate pollution, and which requires EPA to build a new relationship with all of our constituents to find the most-effective means to achieve those goals.

The following EPA "Statement of Definition" is a formal embodiment of what has been the Agency's working definition of pollution prevention, and is consistent with the Pollution Prevention Act of 1990 and the Agency's 1991 Pollution Prevention Strategy. It makes clear that prevention is our first priority within an environmental management hierarchy that includes: 1) prevention, 2) recycling, 3) treatment, and 4) disposal or release.

While it is subject to further refinement, this definition should provide a common reference point for all of us. As you review and apply the definition in your work, please keep the following points in mind:

- As always, whether the pollution prevention option is selected in any given situation will depend on the requirements of applicable law, the level of risk reduction that can be achieved, and the cost-effectiveness of that option.

- Accordingly, the hierarchy should be viewed as establishing a set of preferences, rather than an absolute judgement that prevention is always the most desirable option. The hierarchy is applied to many different kinds of circumstances that will require judgement calls.
- Drawing an absolute line between prevention and recycling can be difficult. "Prevention" includes what is commonly called "in-process recycling," but not "out-of-process recycling." Recycling conducted in an environmentally sound manner shares many of the advantages of prevention, e.g. energy and resource conservation, and reducing the need for end-of-pipe treatment or waste containment.

As EPA looks at the "big picture" in setting strategic directions for the decade ahead, it is clear that prevention is key to solving the problems that all our media programs face, including the increasing cost of treatment and cleanup. In the common-sense words of Benjamin Franklin, "an ounce of prevention is worth a pound of cure."

Please use the Statement of Definition of Pollution Prevention in all of your EPA activities.

POLLUTION PREVENTION: EPA STATEMENT OF DEFINITION

(pursuant to the Pollution Prevention Act of 1990 and the Pollution Prevention Strategy)

Under Section 6602(b) of the Pollution Prevention Act of 1990, Congress established a national policy that:

- pollution should be prevented or reduced at the source whenever feasible;
- pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and
- disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

Pollution prevention means "source reduction," as defined under the Pollution Prevention Act, and other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water, or other resources, or
- protection of natural resources by conservation.

The Pollution Prevention Act defines "source reduction" to mean any practice which:

- reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and

- reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

The term includes: equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.

Under the Pollution Prevention Act, recycling, energy recovery, treatment, and disposal are not included within the definition of pollution prevention. Some practices commonly described as "in-process recycling" may qualify as pollution prevention. Recycling that is conducted in an environmentally sound manner shares many of the advantages of prevention--it can reduce the need for treatment or disposal, and conserve energy and resources.

In the agricultural sector, pollution prevention approaches include:

- reducing the use of water and chemical inputs;
- adoption of less environmentally harmful pesticides or cultivation of crop strains with natural resistance to pests; and
- protection of sensitive areas.

In the energy sector, pollution prevention can reduce environmental damages from extraction, processing, transport, and combustion of fuels. Pollution prevention approaches include:

- increasing efficiency in energy use;
- substituting environmentally benign fuel sources; and
- design changes that reduce the demand for energy.

For more information contact:

- the Pollution Prevention Policy Staff (202-260-8621), or
- the Pollution Prevention Division, Office of Pollution Prevention and Toxics (202-260-3557)

Attachment 13

CC Guidance to WGs on Good Combustion Practices

GOOD COMBUSTION PRACTICES

This guidance is intended to be used by the source work groups in their evaluation of alternative concepts regarding good combustion practices. While operator training could also be considered a good combustion practice, it is covered by separate guidance.

Examples of practices listed are intended to indicate the range of existing practices which are dependent on the specific type of equipment utilized and the fuel/waste input to the combustion device. All examples of specific techniques are not considered applicable to all combustion sources. The source work groups should be requested to evaluate techniques, practices, and possible standard approaches appropriate for subcategories or other subsets of sources.

Periodic checks and adjustments of combustion equipment are intended to occur at intervals appropriate for the source, with key combustion checks timed no less frequent than to coincide with overhaul frequencies.

Good Combustion Technique	Examples of Practices	Applicable Source Types	Possible Standard
Operator practices	-Official documented operating procedures, updated as required for equipment or practice change -Procedures include startup, shutdown, malfunction -Operating logs/record keeping	All	-Maintain written site specific operating procedures in accordance with GCPs, including startup, shutdown, malfunction
Maintenance knowledge	-Training on applicable equipment & procedures	All	-Equipment maintained by personnel with training specific to equipment
Maintenance practices	-Official documented maintenance procedures, updated as required for equipment or practice change -Routinely scheduled evaluation, inspection, overhaul as appropriate for equipment involved -Maintenance logs/record keeping	All	-Maintain site specific procedures for best/optimum maintenance practices -Scheduled periodic evaluation, inspection, overhaul as appropriate
Stoichiometric (fuel/air) ratio	-Burner & control adjustment based on visual checks -Burner & control adjustment based on continuous or periodic monitoring (O ₂ , CO, CO ₂) -Fuel/air metering, ratio control -Oxygen trim control -CO control -Safety interlocks	Open combustion	-SR limits appropriate for unit design & fuel -Routine & periodic adjustment -CO limit

Good Combustion Technique	Examples of Practices	Applicable Source Types	Possible Standard
Firebox (furnace) residence time, temperature, turbulence	<ul style="list-style-type: none"> -Supplemental stream injection into active flame zone -Residence time by design (incinerators) -Minimum combustion chamber temperature (incinerators) 	<ul style="list-style-type: none"> -Open combustion with supplemental vent streams -Incinerators 	
Proper liquid atomization	<ul style="list-style-type: none"> -Differential pressure between atomizing media & liquid -Flow ratio of atomizing media to liquid flow -Liquid temp or viscosity -Flame appearance -Atomizer condition -Atomizing media quality 	Open combustion with liquid fuel/waste	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks -Maintain procedures to ensure adequate atomization & mixing with combustion air
Fuel/waste quality (analysis); fuel/waste handling	<ul style="list-style-type: none"> -Monitor fuel/waste quality -Fuel quality certification from supplier if needed -Periodic fuel/waste sampling and analysis -Fuel/waste handling practices 	All- where appropriate	<ul style="list-style-type: none"> -Fuel/waste analysis where composition could vary & of significance to HAP emissions (e.g., not pipeline natural gas) -Fuel/waste handling procedures applicable to the fuel/waste
Fuel/waste sizing	<ul style="list-style-type: none"> -Fuel/waste sizing specification & checks -Pulverized coal fineness checks 	Solid fuel/waste firing	<ul style="list-style-type: none"> -Specification appropriate for fuel/waste fired -Periodic checks
Combustion air distribution	<ul style="list-style-type: none"> -Adjustment of air distribution system based on visual observations -Adjustment of air distribution based on continuous or periodic monitoring 	Mainly stoker and solid fuel firing	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks
Fuel/waste dispersion	<ul style="list-style-type: none"> -Adjustment based on visual observations 	Solid fuel/waste firing	<ul style="list-style-type: none"> -Routine & periodic adjustments & checks

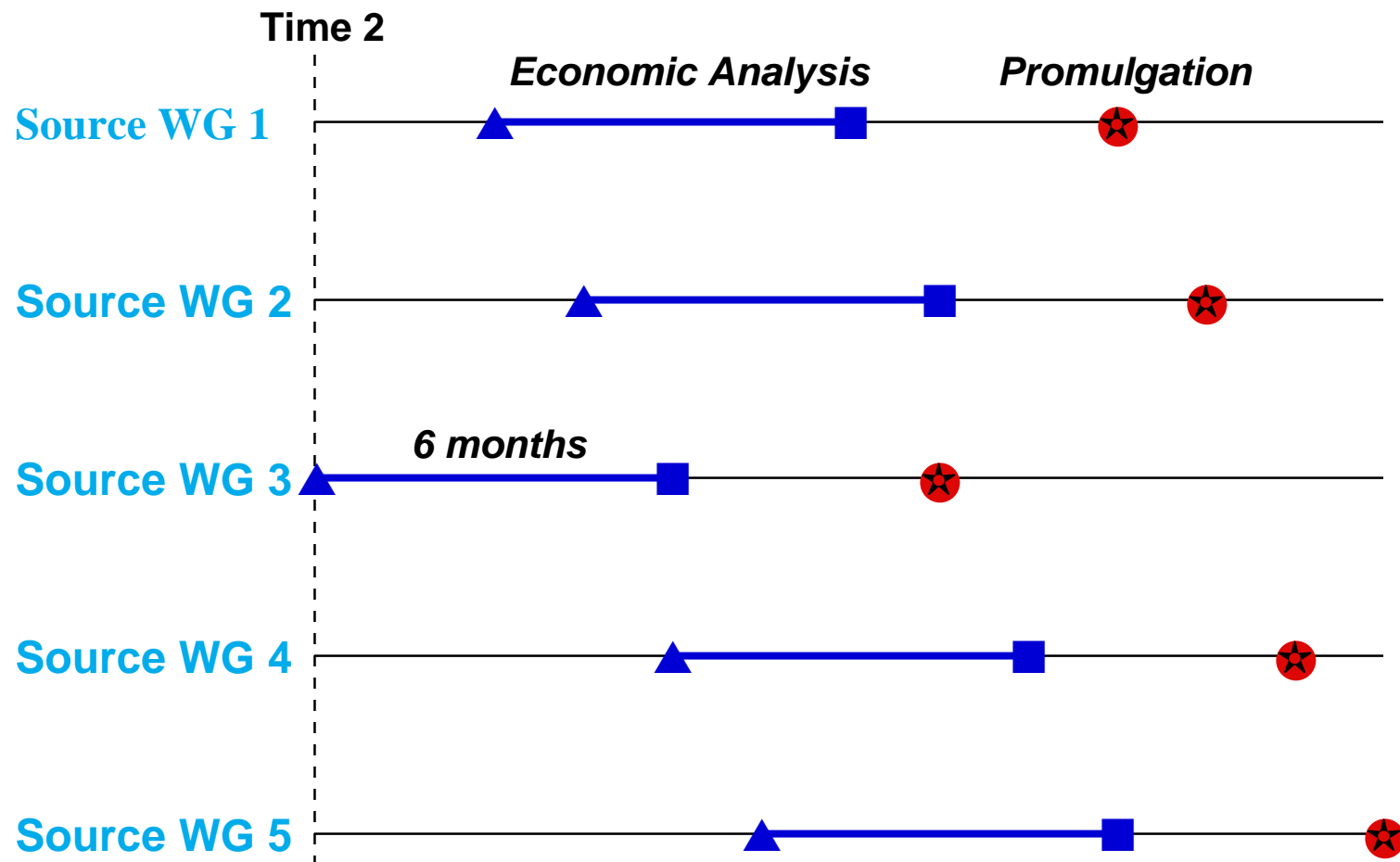
Attachment 14

Economic Analysis Work Group Presentation

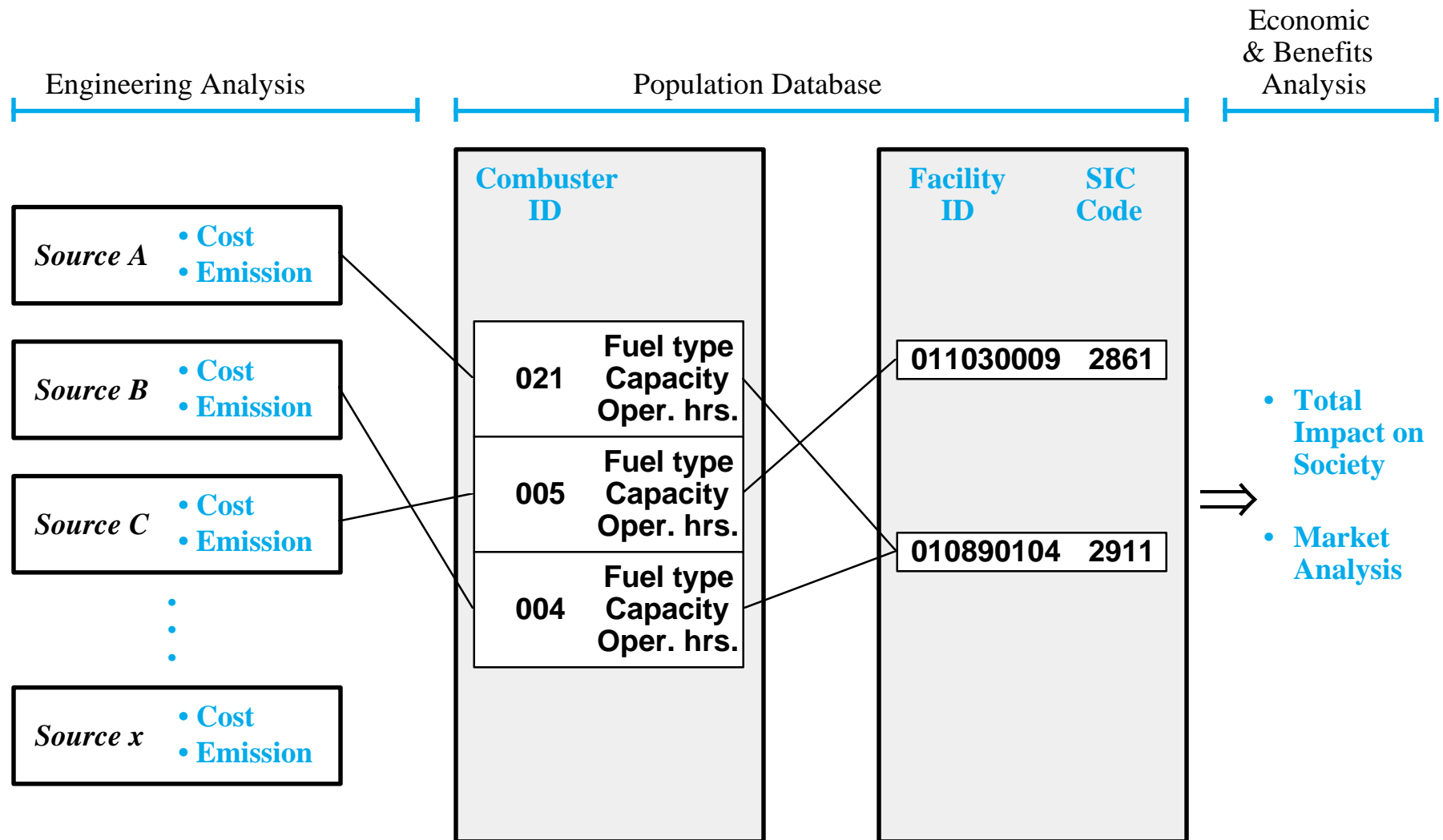
Economic Analysis Work Group Activities and Deliverables

Description of Activity or Deliverable	Timeline
Representatives from Econ WG meet with Source WGs to discuss data requests for economic and benefits analysis	Completed
Econ WG meets with Source WG Subgroups	Ongoing
<i>Source WGs provide preliminary data on population and costs</i>	<i>Time 1</i>
Econ WG presents analysis plan at the CC Meetings	One Month after Time 1
<i>Econ WG receives final data from Source WGs to support economic and benefits analysis</i>	<i>Time 2</i>
Econ WG performs overall economic impact and benefits analysis, considering interactions among source categories	Six Months Beginning at Time 2
Econ WG presents preliminary results of economic and benefits analysis to the CC and Source Work Groups	Six Months after Time 2

It Is Likely That Source Work Groups' Schedules Will Be Different



All Source WGs Agreed to Link Model Sources with ICCR Inventory Database



Consistent Data Development Assumptions and Methods Across Source WGs Will Be Important for the Economic and Benefits Analysis

	Proposed
1) Base Year of Analysis	(2005)
2) Cost Data in Real Dollars	(\$1998)
3) Discount Rate	(7%)

Consistent Data Development Assumptions and Methods Across Source WGs Will Be Important for the Economic and Benefits Analysis

- 1) Base Year of Analysis**
- 2) Cost Data in Real Dollars**
- 3) Discount Rate**

Proposed

Attachment 15

**Paper for Process Heater Work Group Closure
Presentation on Direct-Fired Units**

CLOSURE ON DIRECT-FIRED PROCESS HEATERS IN THE ICCR

DECISIONS BY PROCESS HEATERS WORKGROUP ON DIRECT-FIRED PROCESS HEATERS

The focus of the Process Heater Workgroup (PHWG) is on indirect-fired process heaters.

The Process Heaters Workgroup recommends that direct-fired process heaters be addressed through the various source specific MACT rulemaking proceedings that the Agency is undertaking, and that the Agency do so in a timely manner.

If in the course of review and deliberations by the PHWG, a category of direct-fired process heaters that would not otherwise be addressed by the Agency is identified that appears to be an appropriate candidate for MACT standards then this category could be considered for inclusion in the ICCR.

BACKGROUND

Definition

Direct-fired process heaters are devices where the products of combustion mix with process materials and the combined emissions exit the same stack.

Statement of Issue

The ICCR Process Heater Source Workgroup has been discussing indirect versus direct-fired process heaters since the first meeting. Indirect-fired process heaters are the accepted focus of the ICCR Process Heater Workgroup.

At the November 20, 1997 PHWG meeting, EPA stated that their focus will be on indirect-fired process heaters at this time. The issue was discussed by the PHWG members and a subgroup was formed to present a position for the workgroup to consider.

The subgroup included:

Bruno Ferraro

Jane Williams

Lawrence Otwell

Oliver Stanley

David Smith

Considerations

Indirect-fired process heaters burn a fuel (gas, liquid or solid) or combination of fuel and waste (as defined by the solid waste subgroup) to produce heat or energy for a process. The products of combustion do not mix with the process. The emissions result only from the combustion of this fuel or waste. Indirect-fired process heaters should be addressed in their own category.

Direct-fired process heaters are much different. The products of combustion (from gas, liquid or solid fuels and/or waste) mix with the process emissions and exit from the same stack. Here are some facts that affect direct-fired process heater emissions:

1. There are a wide variety of processes that are included. These include lithographic ovens, paint drying ovens, asphalt batch plants, limestone driers, metal coil drying ovens, plastics manufacturing processes, chemical manufacturing process, polyester resin plants, reinforced fiberglass part curing ovens, farm and commercial grain and feed dryers, food related process dryers and ovens, secondary aluminum smelting furnaces and hundreds more.
2. Many of these direct-fired sources have their own industry specific MACT requirements due by November 15, 2000. Emissions from these direct-fired process heaters will be covered under these MACTs.
3. The emissions from all of these hundreds of processes vary with the type of process materials used, the type of fuels burned, and the type of control equipment applied to the source.
4. The emissions from direct-fired process heaters are source and industry specific. The only way to properly identify air pollutants that may be emitted from these source specific direct-fired process heaters is to have specific knowledge of the process and the raw materials used in that process.
5. The ICCR process heater workgroup is technically prepared to address the emissions from the combustion of fuels and wastes, but does not have enough information to address air pollutants that may be emitted from the wide variety of direct-fired process heaters. The technical representation from the hundreds of industries using direct-fired process heaters in the ICCR process heater workgroup is limited and not sufficient to address emissions from these direct-fired sources.

Attachment 16

**Overheads/Handout for Process Heater WG
Presentation on MACT Floor for Indirect Gas- and
Liquid- Fired Process Heaters**

Inventory Database Process Heater Control Technology Assessment



EPA ICCR Coordinating Committee
Meeting
February 25, 1998

Total Process Heaters Summary



	Fuel Type	Total Devices	Total Controlled	% Controlled
	Gas	23265	3189	13.7
	Liquid	5518	2376	43.1
	Solid	1509	316	20.9
	Total	30292	5881	19.4

Total Process Heaters Detailed

Fuel Type	Total Devices	Total Controlled	% Controlled
Landfill Gas	4	0	0
Liquified Petroleum Gas	49	5	10.2
Natural Gas	19253	3011	15.6
Process Gas	3932	173	4.4
Propane Gas	27	0	0
#2 Fuel Oil	2645	1078	41
#2,3,4 or Diesel	6	0	0
#5,6,7 Fuel Oil	2534	1192	47
#6 Fuel Oil	4	0	0
Black Liquor	172	95	55.2
Crude	95	0	0
Other Liquid	48	10	21
Waste Oil	6	0	0
Coal	1007	310	30.8
Soil	1	0	0
Solid Waste	1	0	0
Unspecified Waste	480	0	0
Wood	20	6	30
Totals	30284	5880	19.4

Liquid Fired Process Heaters Summary

Fuel Type	Total Devices	Total Controlled	% Controlled*
Gas	16631	1447	8.7
Liquid	1071	102	9.5
Total	17702	1549	8.8
* Any Control			

Indirect Gas or Liquid Fired with HAPs Controls

Fuel Type	Total Devices	Total Controlled	% Controlled
Gas	15231	47	0.3
Liquid	979	10	1.0
Total	16210	57	0.4
Controls Included Blank, FGR, LEA, Misc., O2, Unk.			

Conclusion

- Basis the ICCR Inventory Database, <1% of Indirect, Gas or Liquid Fired Process Heaters in Database Have HAPs Controls in Place

Attachment 17

Ground Rules for MACT Floor Exercise

Ground Rules for MACT Floor Exercise

OVERVIEW:

Purpose of this discussion: To raise the issue of how to set MACT floor using a situation that crosses workgroups and where it is not clear how to proceed.

Process steps:

1. familiarization with the statute;
2. case study;
3. in caucuses consider the questions below and application of the Statute to this case study
4. write up your ideas on an acetate for presentation to the plenary by your spokesperson
5. presentations by each caucus; no questions or comments at that time
6. round robin to get reactions, ideas, and comments from the CC members
7. public comment

Questions:

8. For this case study can one identify MACT floor? Is there a MACT floor? If MACT floor, how would you approach it? Does one of the approaches identify work? If not, is there another approach that can identify?
9. If identify MACT floor, must it include an emission limit?
10. What is achievable?
4. How do you define the best performing units?

Ground rules

- Focus on Section 112 only
- Think in terms of existing units
- Follow the agenda steps
- We are not striving for closure. This is a coping session. Today will not be the only opportunity to discuss this topic.
- This is intended to be a safe brainstorming session.
- Questions of interpretation during the presentations are off limits. Clarification questions about the case study are OK. During the presentation on the Statute EPA will not interpret.
- Unique opportunity. Workgroups need help. Please try to avoid going to extremes.

Attachment 18

Relevant Excerpts From the Clean Air Act

Relevant Excerpts From the Clean Air Act

§ 302 Definitions:

(k) The terms “emission limitation” and “emission standard” mean a requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction, and any design, equipment, work practice or operational standard promulgated under this chapter.

§ 112 (d) Emission Standards

(1) In general

The Administrator shall promulgate regulations establishing emission standards for each category of major sources and area sources of hazardous air pollutants listed for regulation pursuant to subsection (c) of this section... The Administrator may distinguish among classes, types, and sizes of sources with a category or subcategory in establishing such standards...

(2) Standards and methods

Emission standards promulgated under this subsection... shall require the maximum degree of emission reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable...through application of measures, processes, methods, systems or techniques including but not limited to measures which:

- (A) reduce the volume of, or eliminate emissions of, such pollutants through process changes, substitution of materials or other modifications,
- (B) enclose systems or processes to eliminate emissions,
- (C) collect, capture or treat such pollutants when released from a process, stack, storage, or fugitive emissions point,
- (D) are design, equipment, work practice or operational standards (including requirements for operator training or certification) as provided in subsection (h) of this section, or
- (E) are a combination of the above.

(3) New and existing sources

The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator. Emission standards promulgated under this section for existing sources...but shall not be less stringent, and may be more stringent than:

- (A) the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)...or
- (B) the average emission limitation achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain such emissions information) in the category or subcategory for categories or subcategories with fewer than 30 sources.

§ 112 (h) Work practice standards and other requirements

(1) In general

For the purpose of this section, if it is not feasible in the judgement of the Administrator to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, the Administrator may, in lieu thereof, promulgate design, equipment, work practice, or operational standard or combination thereof, which in the Administrator's judgement is consistent with the provisions of subsection (d) or (f) of this section. In the event the Administrator promulgates a design or equipment standard under this subsection, the Administrator shall include as part of such standard such requirements as will assure the proper operation and maintenance of any such element of design or equipment.

(2) Definition

For the purpose of this subsection, the phrase "not feasible to prescribe or enforce an emission standard" means any situation in which the Administrator determines that:

- (A) a hazardous air pollutant or pollutants can not be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or
- (B) the application of measurement methodology to a particular class of sources is not practicable due to technological and economic limitations.

(3) Alternative standard

If after notice and opportunity for comment, the owner or operator of any source establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a

reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative...

(4) Numerical standard required

Any standard promulgated under paragraph (1) shall be promulgated in terms of an emission standard whenever it is feasible to promulgate and enforce a standard in such terms.

Attachment 19

MACT Floor Exercise Case Study

MACT Floor Exercise Case Study

Process

- Combustion Device
- Source Subcategory
- Firing a Fuel
- Fuel Combustion Generates One Hazardous Air Pollutant
- No Add-On Control

Data

- Valid QA/QC'd Data
- Representative Operating Conditions
- Limited, Representative Data Set
- No Systematic Variation
- Variability Due Only to Inherent Variations in Process Conditions, Sampling and Analytical Techniques

Graph of emission data for five units not available in electronic version. See docket copy for graph.

How Do We Set a MACT Floor?

- Possible Approaches
- No MACT Floor
- Numerical Emission Limit
- Best 12%
- Average of all Points
- X% Above Highest Point
- $X\sigma$ Above Mean
- Other